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Vol. XXV
No. 42

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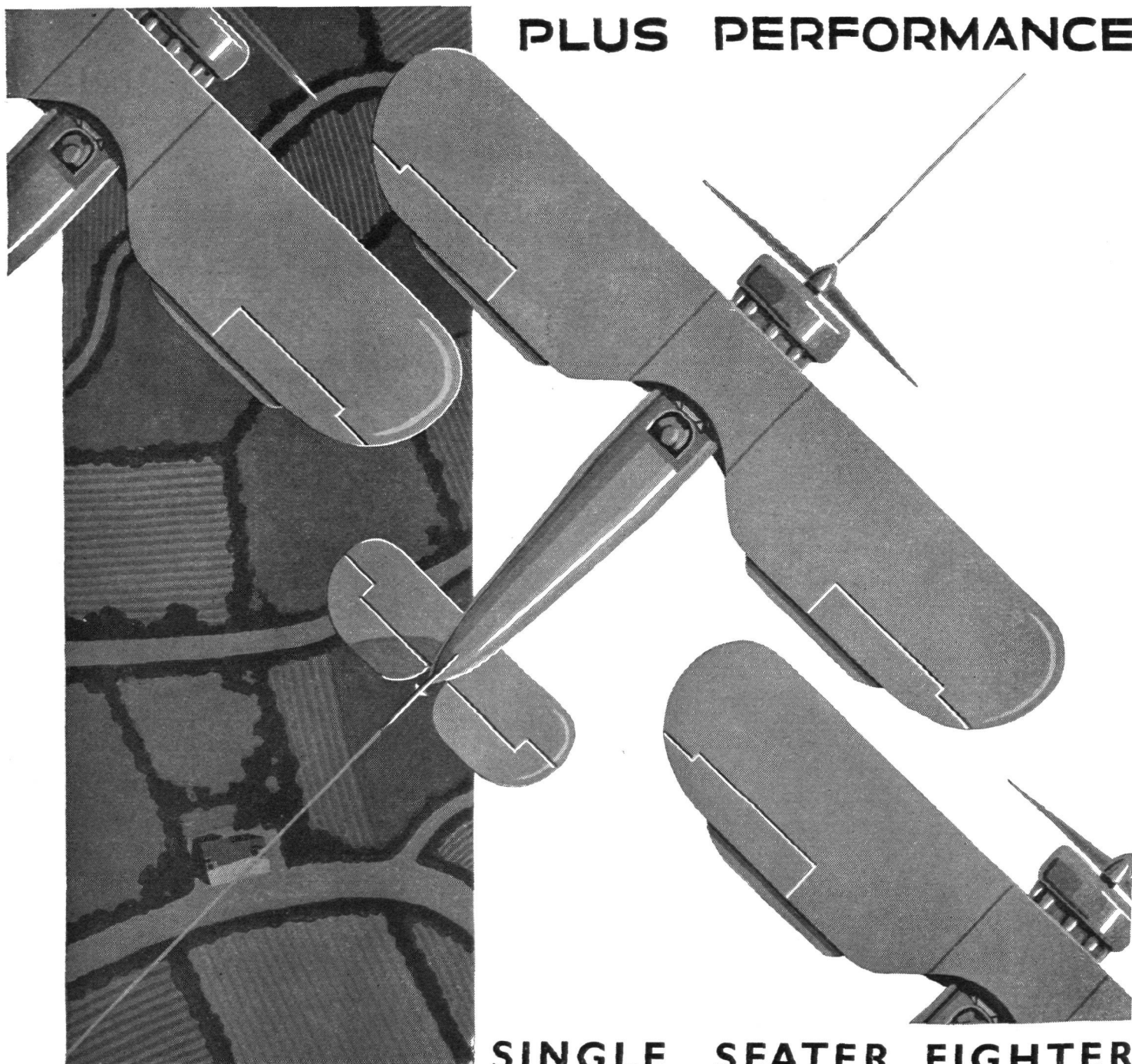


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FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- 1933.
- Oct. 21. Annual Reunion Dinner of No. 6 Wing, R.N.A.S., and Nos. 66 and 67 Wings, R.A.F.
- Oct. 21. Reading Ae.C. Lady Pilots' Lunch.
- Oct. 24. "Recent Development and Immediate Future of Civil Aviation." Lecture by E. Y. Dolby before Students' Section, R.Ae.S.
- Oct. 27. Hull Ae.C. Annual Ball, at Beverley Road Baths, Hull.
- Oct. 27-28. Lampport Hall Club "Concours d'Elegance," Sywell Aerodrome.
- Nov. 2. "Variable-Pitch Airscrew and Variable Gears," Lecture by W. G. Jennings before R.Ae.S.
- Nov. 3. Norfolk and Norwich Aero Club Annual Ball, at Thatched Assembly Rooms, Norwich.
- Nov. 16. "Stiffness of Aeroplane Wings." Lecture by H. Roxbee Cox before R.Ae.S.
- Nov. 24. Yorkshire Ae.C. Annual Dance, Hotel Majestic, Harrogate.
- Nov. 25. Comrades of the R.A.F. Reunion Dinner, at Thames House Restaurant, Millbank, S.W.1.
- Nov. 30. "Tail Buffeting." Lecture by Dr. W. J. Duncan before R.Ae.S.
- Dec. 1. No. 70 Sqdn., R.A.F., Reunion Dinner, at R.A.F. Club, Piccadilly.
- Dec. 1. Lancashire Ae.C. Annual Ball, Midland Hotel, Manchester.
- Dec. 7. "Possible Future Development of Aircraft Engines." Lecture by A. H. R. Fedden before R.Ae.S.
- Dec. 8. Calshot Reunion Dinner, at R.A.F. Club, Piccadilly, W.1.
- Dec. 14. "Light Alloys for Aeronautical Purposes." Lecture by Dr. L. Aitchison before R.Ae.S.
- Dec. 15. Close of entries for International Touring Competition (1934), Poland.
- Dec. 18-24. International Rally at Cairo and Meeting of the F.A.I.

EDITORIAL COMMENT



THE London Chamber of Commerce has delivered another kick against the pricks. Several times it has approached the Postmaster-General to urge greater encouragement of air mails, only to be told politely that it was the affair of the Air Ministry to subsidise air mails, and that the Post Office proposed to stick to its annual profits. The position of the Air Ministry was that, having paid so much to Imperial Airways as subsidy, it could do no more, and anyway the carriage of mails was the business of the G.P.O. The Chamber found itself in the position of a Rugby threequarter who was always tackling his opposite number only to find that the latter had passed the ball before going down to the tackle. But on September 28 (as recorded in FLIGHT in the issue of that week) the Chamber succeeded in making a "smother tackle" of the Air Minister and the Assistant Postmaster-General in one fell swoop. There was no one to whom the ball could be passed, and it had to be grounded. The next thing which must happen in Rugby is the formation of a scrum, and Sir Geoffrey Clarke, Chairman of the Council of the Chamber, called for a scrum—an impartial tribunal to take evidence. It is an excellent suggestion. Let the Cabinet referee sound his whistle, let the forwards on each side link arms and put their heads down, and then the issue will be decided by hard shoving.

The London Chamber of Commerce definitely made three proposals, namely (1) the separation of mail and passenger services, (2) night flying, and (3) lower air mail charges and a flat rate for all Empire air mails. FLIGHT heartily approves of all three suggestions.

We have written much about the desirability of separate services for mails and passengers. Imperial Airways, we understand, do not quarrel with the principle; they only say that under the terms of their present contract it would not pay them to run separate services, and that their first duty is to become self-supporting. We cannot quarrel with that attitude. We want Imperial Airways to be-

come self-supporting, and we are ready to believe that they know their own business and are the best judges as to how this object is to be reached. Given different terms, Imperial Airways are ready to run separate mail services, and doubtless they would run them very well. It is, we believe, the idea that when the Boulton & Paul mail-plane has passed all its tests it is to be handed over to Imperial Airways under a special arrangement for trial runs across the Empire. It may be noted that the K.L.M., who have a particularly happy agreement with the Holland Post Office, are in favour of combined services. Plenty of other air transport authorities take the other view. In the contract terms recently published by the Australian Government for the service between Singapore and Australia, mails are definitely to take precedence of passengers. The Tata Air Line in India will look at nothing but mails for the present. Most of the air services in Canada, we believe, regard mails as the most important traffic. The French Aéropostale service to South America is only for mails. Without any doubt we British want to get our mails to and from India, Australia, New Zealand, and South Africa as fast as an aeroplane can fly. Passengers do not want to travel so fast. They are content to beat the steamship by a week or a fortnight. In fact the passengers' view is comparative; the needs of the mails are superlative.

Night flying is a problem by itself, and a very complex one. There is one useful route in the Prairie Provinces of Canada which has been lit for night flying, and has operated for a time with success. How can Europe be lit for night flying? Internationalism seems the only way, but the heavens forbid that we should advocate the calling together of an aeronautical Geneva! In time each nation will light up its own airways, and in still more time the whole system will become satisfactory. Once our aircraft have shaken the air of Europe off their wings it ought to be possible for us to arrange for night flying over British lands, wherever it is desirable and not impossible. Lord Londonderry, in his reply, pointed out that there were several parts of the Empire routes where night flying is as yet hardly practicable. Of course, the Air Minister had to say something, for he could not refer the Chamber to the Post Office, and he could hardly say that he thought the Post Office ought to do all that the Chamber asked. So he took refuge in stating facts of common knowledge. He also added (and this, of course, told us a lot that we did not know before) that the question of improving air-mail services was largely a matter of finance. As the Bellman, in the *Hunting of the Shark*, said: "It's a maxim tremendous but trite." We feel sure that Lord Londonderry sympathised with the objects of the Chamber, but as a Cabinet Minister, and also with the Assistant Postmaster-General at his elbow, he could hardly open his heart to them. What he *can* do is to urge the setting up of the tribunal asked for by the Chamber, so that the Cabinet may see the reasons for deciding that air mails must be improved and that they must not be held up while the Air Ministry and the Post Office keep passing the ball to and fro whenever a tackle seems imminent. The referee's whistle is urgently needed, and the Secretary of State for Air seems the person to ask the Cabinet to blow it.

Reduction of charges was the other point raised by the London Chamber of Commerce. Sir Geoffrey Clarke asked for a flat rate for the Empire and a cheap one, suggesting 4d. for the first unit and 2d. for each additional unit. He made a very good point when he said that every request for a reduction was met by almost exactly the same arguments as were put forward by the Post Office in 1840 when Rowland Hill proposed the introduction of the penny post. We can add little to that plea. The Post Office makes a profit of 10 million pounds a year, but from that magnificent sum should be deducted a proportion of what the Air Ministry pays in air-mail subsidies, as that comes out of the public funds. If the Government would decide to stop the subsidy and at the same time would order the Post Office to spend money on improving the air-mail service, they would almost certainly confer a great benefit on British commerce. There also remains the possibility that a cheap air-mail rate might surprise the Post Office by paying as well as the penny post used to pay in the happy pre-war years.

❖ ❖ ❖ ❖

Some point is lent to the above remarks about speed by the latest fast flight from England to Australia by Sir Charles Kingsford Smith, which was a very fine flight indeed. What impresses

A Concrete Example

us forcibly is the frequency with which fast flights are made nowadays between different parts of the Empire by solo pilots in small aeroplanes. These flights demonstrate how stoutly engines and machines will stand up to such incessant work, and they also show how tough and enduring are certain pilots. They also demonstrate the possibility of carrying mails at a speed which is really worth while, and they remind the general public of the advantages of long-distance air operation.

Of course, as we admitted above, passengers cannot be hurried along at such a pace. They must certainly be given opportunity to sleep in comfort. What these flights show is the difference which becomes possible when no passengers are carried. At the same time these flights are hampered by keeping to one pilot and one machine all through, and by the absence of night-lighting along the route. If, with these drawbacks, an aeroplane can get to Australia in just over seven days, it would certainly be possible to get mails there very much faster with a proper organisation and with such facilities as the London Chamber of Commerce suggested.

In a properly organised air mail service, which we shall certainly have in the future, there will be changes of machine as well as of pilot, while certain stages will be flown regularly by night. Each pilot will work regularly to and fro over a certain stretch until he knows it as thoroughly as the Croydon pilots know the way to Paris and Cologne. The mail bags will be transferred from the incoming to the outgoing machine with great speed, and the whole operation will take very few minutes. When that happy time comes, the week just taken by Kingsford Smith in reaching Wyndham will seem slow. What the ultimate speed will be, we should not care to prophesy. Probably there will be no such thing as "ultimate" speed.

To Australia in a week!

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SIR CHARLES

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Smith**

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for his record flight to Australia in a
Gipsy Major engined Percival Gull

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ENGLAND-AUSTRALIA IN SEVEN DAYS

Kingsford-Smith Lowers
the Record Once More

THE record for a solo flight from England to Australia of 8 days 20 hr. 47 min. set up last year by C. W. A. Scott has been beaten by a matter of one and a-half days. Sir Charles Kingsford-Smith, the hero of so many noteworthy long-distance flights, has accomplished the journey from England to Australia in 7 days 4 hr. 44 min., and has thus set a by no means easy task to be overcome by the next challenger—and it is reported that "Scotty" means to have a try to regain the record.

This latest effort may be said to be almost an All-Australian affair, for Sir Charles Kingsford-Smith is an Australian himself, while the machine he flew this time, the Percival "Gull" ("Gipsy Major"), was designed by Capt. E. W. Percival, also an Australian.

Before he left England Sir Charles stated that he was not intending to try and beat the record—he wanted to get to Australia as quickly as possible—but if all went well he would probably beat it "incidentally." As it happened, all did go well, and Sir Charles made remarkable progress, in spite of an enforced delay, owing to indisposition, at Gwadar.

Sir Charles flew his Percival "Gull," *Miss Southern Cross*, from Heston to Lympne on October 3, and at 5.28 a.m. (B.S.T.) next morning he set out for Australia, flying non-stop to Brindisi, where he arrived at 4.30 p.m. Leaving at 3.30 a.m. on October 5, Sir Charles made a long non-stop flight of 1,600 miles to Baghdad. He intended to make his next hop to Karachi, and left Baghdad at 4 a.m. (2 a.m. B.S.T.) on October 6. He passed over Basra two hours later, but the next report of his progress stated that he had landed at Gwadar, on the Gulf of Oman, as he was feeling unwell.

After resting overnight, he resumed his flight to Karachi, where he arrived about 10 a.m. on October 7. The journey to Karachi had thus taken just over three days, which easily beat the four days taken by C. A. Butler in 1932, and it would seem that he also beat the 3 days 9 hr. taken by the Duchess of Bedford and Capt. C. D. Barnard in 1929 for the same trip.

Sir Charles left Karachi after a stay of about five hours, and flew to Calcutta, where he arrived at 1.40 p.m. on October 8, and made a stop of half-an-hour for refuelling. Continuing, he next reached Akyab that evening, and left again at dawn next morning, October 9, making a 1,100 miles' flight to Alor Star, arriving at 5.15 p.m. (local time), a day ahead of the record.

He took off at dawn on October 10 for Sourabaya, and as he passed over Batavia he dropped the following message:—"London to Batavia in six days, three hours—how's that? Please telephone Semarang to have two



ROSS SMITH & K.M. SMITH 27 days 20 hr.



BERT HINKLER - 15 days 12 hr



KINGSFORD SMITH
9 days 21 hr. 40 min.



C.W.A. SCOTT
9 days 4 hr. 11 min.



C.A. BUTLER
9 days 2 hr. 29 min.



C.W.A. SCOTT
8 days 20 hr 47 min.



KINGSFORD SMITH
7 days 4 hr. 44 min.

THE SHRINKING WORLD:
These diagrams show how the various flights from England to Australia, from the first achievement of Sir Ross Smith and his brother Sir Keith in 1919, to the latest effort by Sir Charles Kingsford-Smith, have, metaphorically, shrunk our World

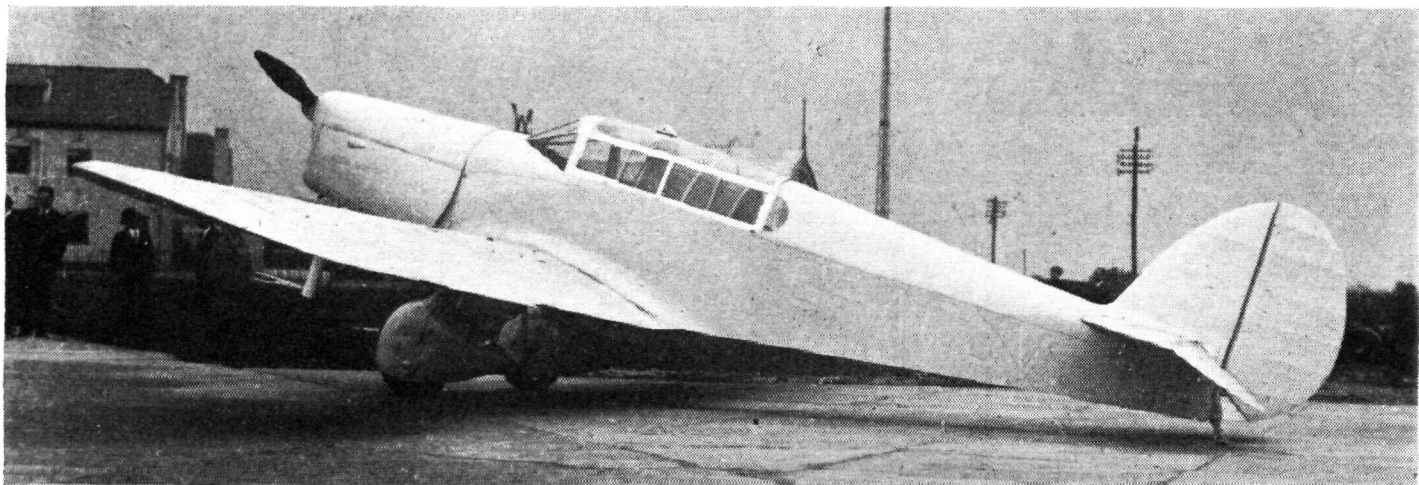
gallons of aero on the ground, as I may have to land for extra oil. Also remind Sourabaya about landing lights. Thank you. Cheerio. — Kingsford-Smith." Sourabaya was reached at 6.23 p.m. (local time), and beating the record was no longer "incidental," for Sir Charles announced that, being so well ahead, he intended to "go for a new fastest time England-Australia" record!

Sir Charles started from Sourabaya on the final stage of his flight at 4.55 a.m. (local time), October 11, and chose the shorter sea crossing to Wyndham. At 5.12 p.m. local time (9.12 a.m. G.M.T.) he landed at Wyndham, where he was enthusiastically welcomed by the entire population. "Smithy" looked in the best of health, but said he felt run down and was a bundle of nerves.

"I was a day longer than I should have been" (he said). "I am getting too old for these stunts. On the Persian Gulf I went to pieces and had to put in a day in bed. I don't like travelling over the sea with one engine.

Sir Charles Kingsford-Smith (right), who has just accomplished a flight to Australia in 7 days. Standing by his side is Mr. Charles Ulm, likewise an Australian—and once co-pilot with Sir Charles—who is also hustling to Australia. (FLIGHT Photo.)





MISS SOUTHERN CROSS : The Percival "Gull" ("Gipsy Major") used by Sir Charles Kingsford-Smith for his record flight to Australia.

One hears all sorts of knocks and splutters, but, as a matter of fact, the engine and plane behaved perfectly. It has been a pretty constant fight against sleeplessness and that extraordinary sickness and nervousness I get over water. I suppose doctors would call it aquaphobia. At one stage over the Timor Sea I felt that I would have to break out of the cabin. My last long flight will be the Melbourne Centenary Air Race, which I hope to win through. I have no doubt the present record will be severely flattened."

Of course, Sir Charles Kingsford-Smith received numerous messages of congratulation. Sir Isaac Isaacs, the Governor-General of Australia, sent the following telegram to Sir Charles: "His Majesty desires me to convey warm congratulations on your remarkable flight." The Marquess of Londonderry, Secretary of State for Air, sent the following telegram: "On behalf of the Air Council I send you warmest congratulations on your magnificent flight from England to Australia." A message of congratulation has also been despatched by the Royal Aero Club.

On October 12 Sir Charles left Wyndham for Sydney, but had to land at Camooweal, 750 miles from Wyndham. Next day he flew against strong headwinds to Brisbane, his birthplace. Large crowds greeted Sir Charles on his arrival at Mascot Aerodrome, Sydney, on October 14, and about 40 aircraft met him over the harbour. Sir Charles continued next day to Essendon Aerodrome, Melbourne, escorted by seven other aeroplanes. Nearly 100,000 people gave him an enthusiastic welcome.

Sir Charles has a number of noteworthy flights to his credit—apart from his activities in connection with Australian National Airways, which maintained a successful unsubsidised air service in Australia for some time—including the following:—1927, round Australia in 10 days (7,000 miles); 1928, across the Pacific from U.S.A. to Australia (7,347 miles); first non-stop flight across Australia, Melbourne-Perth; first flights between Australia and New Zealand; 1929, Australia-England in 12½ days; 1930, Ireland-New York and on to San Francisco, thus completing his circuit of the globe; England-Australia in 9 days 21 hr. 40 min.; 1931, Australia-England in 13 days; Xmas mail flight from Australia to England in 16

days; 1932, New Year mail from England to Australia in 12½ days; Australia-New Zealand and back.

As a matter of comparison, the accompanying logs of the various England-Australia flights (that is, the "record" ones) may be of interest. The first flight of all, that of Ross and Keith Smith in 1919, although of a rather different character to the solo efforts later, may be taken as our "datum line," i.e., four weeks' flying from start to finish. The Ross-Smith flight was accomplished in the following stages:—

Depart Hounslow Nov. 12, 1919, and reached Lyons. Nov. 13, Lyons-Pisa. Nov. 15, Pisa-Rome. Nov. 16, Rome-Naples. Nov. 17, Naples-Suda Bay. Nov. 18, Suda Bay-Cairo. Nov. 19, Cairo-Damascus. Nov. 20, Damascus-Ramadie. Nov. 21, Ramadie-Basra. Nov. 23, Basra-Bandar Abbas. Nov. 24, Bandar-Karachi (13 days). Nov. 25, Karachi-Delhi. Nov. 27, Delhi-Allahabad. Nov. 28, Allahabad-Calcutta. Nov. 29, Calcutta-Akyab. Nov. 30, Akyab-Rangoon. Dec. 1, Rangoon-Bangkok. Dec. 2, Bangkok-Singora. Dec. 4, Singora-Singapore. Dec. 6, Singapore-Kalidjatti. Dec. 7, Sourabang. Dec. 8 10, Bima-Atamboca. Dec. 10, arrived Port Darwin.

The Technical Aspects of the Flight

Having paid due homage to the human factor, it is of interest to refer to the mechanical element. "Smithy" was helped in his attempt by the fact that he was flying a machine which is considerably faster than that used by Scott. That meant that he could use the extra margin either in taking longer rests or in covering greater distances in the day without resorting to night flying.

The Percival "Gull" is a low-wing cabin monoplane, in which great care has been taken to reduce air drag. It may be recollected that the first batch of "Gulls" was built by George Parnall, of Bristol, as recorded in FLIGHT on July 29, 1932. The tapering cantilever wing is of wood construction, and use is made of the type of spar construction invented and patented by Mr. Basil B. Henderson. This consists essentially of a set of criss-cross drag bracing members joining top and bottom booms of the two main spars, and forming with them a kind of box which is very strong in torsion. This construction was first used by Mr. Henderson in his little "Hobo," and later in the Hendy 302.

Capt. Percival has fitted several types of engine to the "Gull." The first machine had the "Hermes IV," and

(Concluded on page 1062)

RECORD SOLO FLIGHTS, ENGLAND-AUSTRALIA, 1928-1933

	Bert Hinkler, Avro Avian (Cirrus), Feb. 7-22, 1928. 15 days 12 hr.	Kingsford-Smith, Avian Sports (Gipsy II), Oct. 9-19, 1930. 9 days 21 hr. 40 min.	C. W. A. Scott, D.H. Moth (Gipsy II), April 1-10, 1931 9 days 4 hr. 11 min.	C. A. Butler, Comper Swift (Pobjoy R.), Oct. 31-Nov. 9, 1931 9 days 2 hr. 29 min.	C. W. A. Scott, D.H. Moth (Gipsy II), April 19-28, 1932 8 days 20 hr. 47 min.	Kingsford-Smith, Percival Gull (Gipsy Major), Oct. 4-11, 1933. 7 days 4 hr. 44 min.
Day	Stage	Stage	Stage	Stage	Stage	Stage
1	Croydon-Rome	Heston-Rome	Lympne-Belgrade	Lympne-Naples	Lympne-Brindisi	Lympne-Brindisi.
2	Malta	Athens	Aleppo	Athens	Aleppo	Baghdad.
3	Tobruk	Aleppo	Baghdad	Baghdad	Basra	Gwadar.
4	Ramleh	Bushire	Baluchistan	Jask	Karachi	Karachi
5	Basra	Karachi	Jodhpur	Jansi	Calcutta	Akyab.
6	Jask	Allahabad	Calcutta	Akyab	Rangoon	Alor Star.
7	Karachi	Rangoon	Victoria Pt.	Victoria Pt.	Singapore	Sourabaya.
8	Cawnpore	Singapore	Palembang	Batavia	Sourabaya	Wyndham.
9	Calcutta	Sourabaya	Bima	Koepang	Koepang	
10	Rangoon	Atamboca	Port Darwin	Port Darwin	Port Darwin	
11	Victoria Pt.	Port Darwin				
12	Singapore					
13	Bandung					
14	Bima					
15	Port Darwin					



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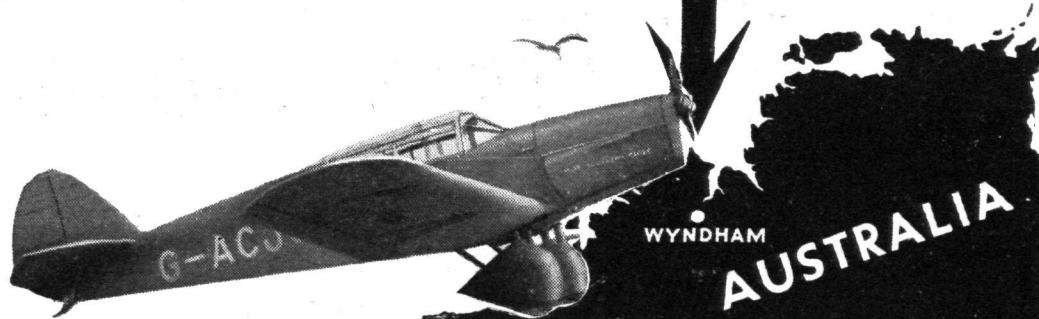


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THE NEW ALTITUDE RECORD

A NEW world's altitude record of 13,661 m. (44,819 ft.) was established by the French airman, Gustave Lemoine, at Villacoublay Aerodrome on September 28 last, and has just been homologated by the Contest Committee of the Aero Club of France, after verification of the barographs by the laboratory of the Arts and Metiers Institute of Paris. This new record surpasses the previous one of 13,404 m. (43,976 ft.) established last year by Capt. Cyril F. Uwins on a Vickers Vespa fitted with Bristol "Pegasus" engine.

Piloting a Potez plane, type 50, of series construction but with certain modifications designed for this flight, and equipped with a Gnome-Rhone "Mistral-Major" KRSD, double row, 14-cyl., 800 h.p. supercharged, geared, air-cooled engine, of series construction but also prepared especially for this flight, Lemoine took off from the Villacoublay Aerodrome at 10.40 a.m., and remained in the air 2 hr. 5 min. He stated on landing that he had put on his oxygen mask on reaching the altitude of 3,000 m., but that the extreme cold of 60 deg. below zero C. which he had encountered after climbing above 13,000 m. was so painful to his eyes that he was obliged to start to come down. It was not possible to put glasses in the goggles that he used as, owing to the very low temperature, the moisture would immediately freeze on the glasses and so obscure his vision. Icicles also formed on his eyelids. Lemoine further said that he had encountered difficult air conditions at these high altitudes, his plane being buffeted about by frequent strong gusts of wind.

The Potez altitude type 50 plane used by Lemoine was first presented by that company last year. It is a fast biplane of the observation type, derived from the well-known Potez type 25 so largely used throughout Europe. It is of wooden construction throughout, covered with fabric, with the exception of the engine mounting and undercarriage which are constructed of duralumin tubing. The upper wing span is somewhat longer than the lower one.

Several modifications designed to increase its ceiling were made in the machine used by Lemoine in this altitude flight.

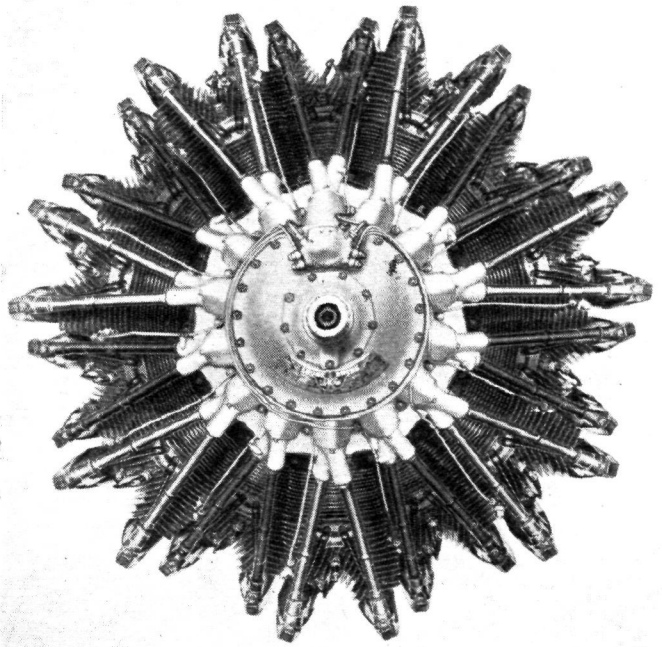
The upper wing span was increased from 14.8 m. (48 ft. 6 in.) to 18.6 m. (61 ft.). The supporting surface was thus increased from 42 sq. m. (452 sq. ft.) to 54 sq. m. (582 sq. ft.).

The plane was "cleaned up" as much as possible, the weight empty being reduced from 1,622 kg. (3,570 lb.) to 1,522 kg. (3,350 lb.).

The forward cockpit, ordinarily occupied by the pilot, was covered in and the barographs and storage batteries placed in it.

The compression ratio of the engine was increased from 5.5:1 to 7.25:1, and a more powerful supercharger installed.

Just enough fuel and oil sufficient for this altitude flight



THE ALTITUDE RECORD ENGINE : The Gnome-Rhone "Mistral-Major" KRSD is a double-row 14-cyl. geared and supercharged engine.

were carried. A special fuel furnished by the Shell Co. of London was used.

The plane thus equipped was designed to attain a ceiling of 14,000 m. (45,800 ft.).

The general characteristics of the plane are as follows: Maximum wing span, 18.6 m. (61 ft.); total length, 9.4 m. (30 ft. 10 in.); height, 3.63 m. (11 ft. 11 in.); total supporting surface, 54 sq. m. (582 sq. ft.).

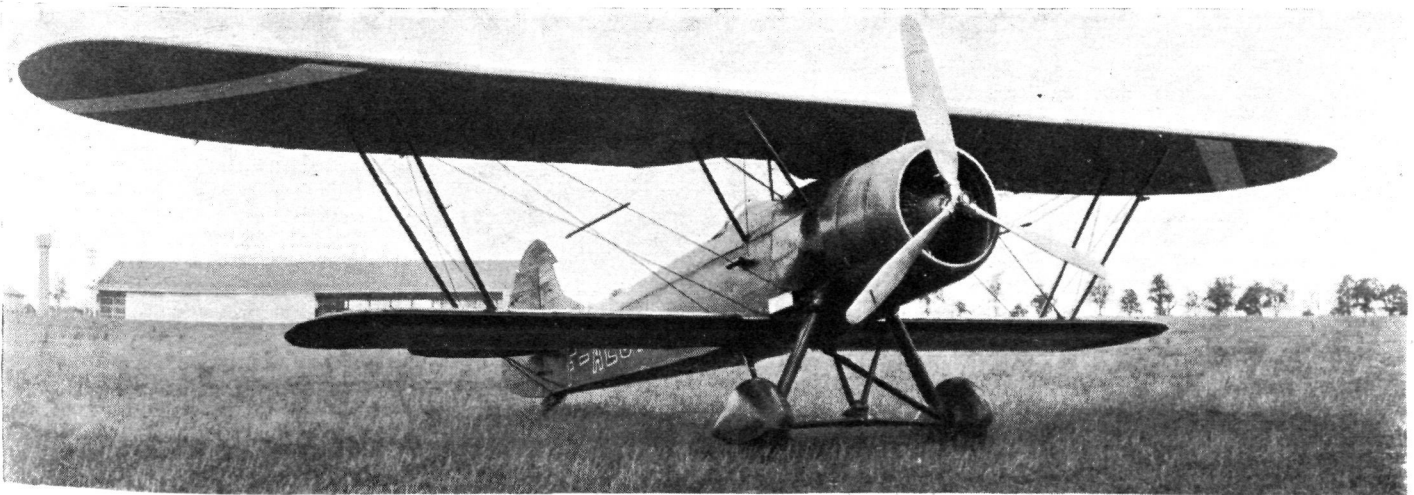
Weight empty, including navigation instruments and fixed equipment, 1,522 kg. (3,350 lb.); petrol, 198 kg. (436 lb.); oil, 30 kg. (66 lb.); total fuel and oil, 228 kg. (502 lb.).

Movable equipment: Pilot, parachute and warm clothing, 80 kg. (176 lb.); oxygen mask and instrument board, 22 kg. (48 lb.); storage batteries, 25 kg. (55 lb.); barographs, 6 kg. (13 lb.).

Total weight of plane at "take off", 1,883 kg. (4,142 lb.); wing loading at "take off," 34.8 kg./sq. m. (7.1 lb./sq. ft.).

The compression ratio of the "Mistral-Major" engine, which gave a sea-level rating of 800 h.p., was raised to 7.25:1 for this altitude flight, and a powerful supercharger turning at a ratio of 10.92:1 of the shaft was installed, which maintained this power up to 6,000 m. (19,700 ft.). The engine was equipped with a Gnome-Rhone 3-bladed propeller geared at a 3:2 ratio.

R. C. W.



CLEANED UP : The Potez 50 used by Lemoine. In the actual altitude flight the N.A.C.A. cowling was not fitted.

BRITISH AIRWORTHINESS REQUIREMENTS

By H. A. Mettam, M.A., F.R.Ae.S.

Mr. Mettam, who is on the Technical Staff of the Westland Aircraft Works, will be known to our readers through his contributions to THE

AIRCRAFT ENGINEER (Monthly Technical Supplement to FLIGHT). His work at Yeovil is closely connected with stressing, and thus he is on familiar ground when he discusses the new Load Factors. Non-technical readers should not be afraid to tackle the following article, which is so written that no technical knowledge is required to understand the arguments set forth. Mr. Mettam points out that the old load factors were lower than those quoted abroad, but that as they were not treated as ultimate factors, our machines were actually strong enough, such items as redundancies in the structure and the materials being either over strength or over thickness not being taken into account in stressing. It was not always easy to convince the foreign buyer that this was so, and from that point of view the new increased load factors may be of benefit to our export trade. But Mr. Mettam calls attention to the fact that the new load factors should be regarded as ultimate factors, otherwise too great an increase in structure weight will result.

The New Civil Load Factor System

THE introduction of Amendment List No. 33 to the Civil Airworthiness Handbook A.P. 1208 brings into force not only a new set of load factors having higher numerical values than those previously in use in this country, but also new assumptions and methods in calculating those factors.

It is unfortunate that such a fundamental change should have been made without any published official explanation of the reasons underlying the new policy. Those reasons are well known to all the British and Dominion Government Departments concerned, and also to the staffs of those designing and constructing firms who constitute the Society of British Aircraft Constructors. To others, however, it may well appear that the introduction of higher factors implies severe criticism and even condemnation of the values used in the past. There are at least two ways of reacting to such an impression according to the viewpoint and experience of the individual. One way is to say that the remarkable freedom from structural failures of British aircraft in the past constitutes the finest possible defence of our old load factor system and that any change to higher factors must be due to Departmental stupidity. Another way is to hail with delight the apparent admission that Great Britain has at last been compelled to bring her airworthiness requirements into line with the higher factors in vogue abroad. There is, however, a third way of looking at this problem, and, by taking into account more than a mere numerical comparison of two tables of figures, we can arrive at a closer understanding of the facts and a different mental reaction from either of those outlined above.

There are two fundamental points which we must postulate before commencing a critical examination of any system of strength determination for aircraft. The first is that in the present state of knowledge any such system must have an empirical and statistical basis to supplement any attempts at a scientific foundation. The second is that the numerical value quoted for a load factor is meaningless without an understanding of the methods by which that value is determined. Elaborating the first point, theory alone cannot tell us how strong various classes of aircraft ought to be. To work on the basis of possible speed range with modern highly powered and highly efficient aircraft would lead to factors in excess of those used in any country in the world. Account must therefore be taken of the limitations placed on abrupt manoeuvres, both by the controllability characteristics of the various types of aircraft and by the common sense and desire for life of the pilots. This is where statistics can help, but these can unfortunately only tell us when our aircraft are strong enough and never how much too strong they may be. A compromise must therefore be reached between the results of practical experience and the guidance given by theoretical investigations. Such compromise will always be to some extent a matter of opinion and therefore readily open to criticism from either side. It is as well therefore for everybody concerned to bear in mind the possibility of making unjustifiable deductions from practical observations as well as the alternative—and even more probable—possibility of basing impeccable mathematical reasoning upon some unsound assumptions.

The Old Load Factor System

Reverting to the second of our two fundamental points we find that the British Airworthiness Department and the British aircraft industry, each working with the same end in view, have combined to produce a system of design and approval whereby aircraft with British certificates of airworthiness have attained a very high standard indeed of structural reliability and efficiency. The Airworthiness Department laid down the numerical values of the factors required and supplemented this skeleton of figures by the flesh sometimes "too, too solid"—of mathematical methods and assumptions and detail requirements and restrictions. To continue our simile, the aircraft industry overlaid the official "body" with the outer vestments of "accepted practice" and improvements due to their own accumulated experience.

For many years there have been two schools of thought with regard to the exact meaning of the British load factors. One school contended that an aircraft should be permitted to break up completely if the full factor load were imposed upon it—but even those who regarded this as the intended spirit of the regulations knew full well that the letter of the regulations would not allow the building of an aircraft as weak as this. The other school considered that it should be possible to impose the full factor load without the structure "yielding" or taking up any permanent non-elastic deflections. The full rigour of this last interpretation has not been legally enforced for many years, but the effect of detail assumptions and requirements has always been to keep the breaking strength well above the nominal figure shown by the standard methods of calculation.

To provide an illustration let us consider how an aircraft designed to the old system of British calculated strength requirements would behave if subjected to the mechanical tests which form the basis of the I.C.A.N. and many foreign strength requirements.

In the first place, the calculations have taken no account of any redundancies in the structure—an assumption primarily intended, of course, to ease the labours of the calculator—and such redundancies almost invariably exist and add materially to the breaking strength. The inevitable example to choose in discussing this point is the effect of the incidence bracing of a biplane, which has to be designed to take half the factor loads if one of the main bracing wires is cut, and which is therefore capable of transferring load from the more heavily loaded of the bracing trusses to that which is less heavily loaded. This adds materially to the strength, and such increase is usually of the order of 10 per cent. to 20 per cent. Moreover, British calculations always have assumed, and will assume, that all structural components are built up from materials having both the minimum strength and the minimum thickness permitted by the specifications. It is most improbable that both minima will be attained simultaneously, and we may expect a further margin of strength on this account also. The existence of these two types of "hidden margin" has been amply proved by the comparison of mechanical test results with calculations.

There were two important difficulties which arose in the application of a load factor system in which the main requirements as defined in the table of factors were

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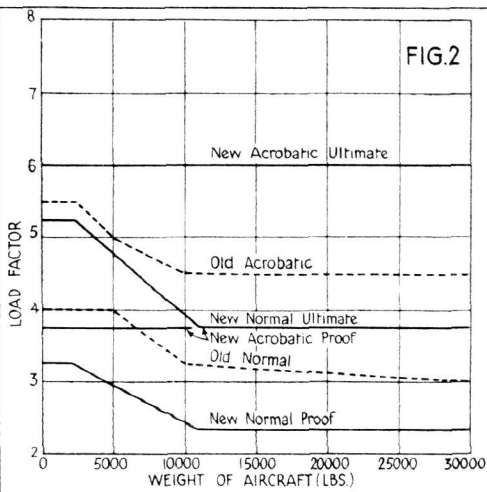
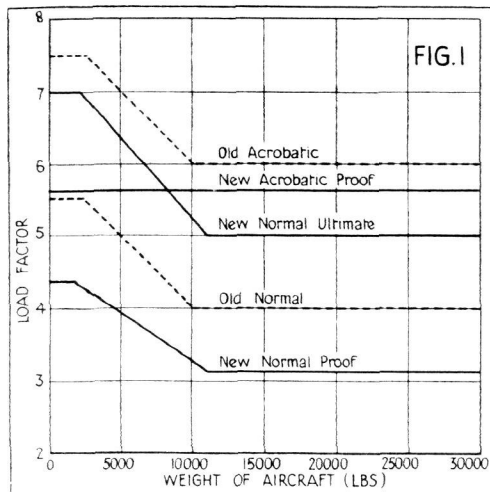
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THE NEW LOAD FACTORS : These charts show the load factors for machines in the "Normal" and "Acrobatic" Categories. Fig. 1 covers the "C.P. Forward" case, and Fig. 2 the "C.P. Back" case.

apparently weak and the desired standard was only maintained by subsidiary regulations and the accepted practice of the industry. The one of these difficulties which primarily affected the Airworthiness Department was the enforcement of a uniform standard of interpretation and the explanation of this standard to newcomers to the art and practice of aircraft design. The other difficulty primarily affected the industry, and was concerned with convincing possible customers that the low numerical values of the calculated British factors were a pessimistic indication of the real strength of British aircraft. Both these troubles have been swept away by the new definition of load factors and the new numerical values set forth in Amendment No. 33 to A.P.1208.

The real increases in strength required are very much less important than the numerical increases in the factors indicate, and consequently the implication that our own past practice was unsound is seen to be without solid foundation. Our British load factors now either equal or surpass the values laid down by the I.C.A.N. (International Commission for Aeronautical Navigation) and have to be determined by methods which differ only from the I.C.A.N. methods in being more strict. These facts should strengthen the position of British aircraft by rendering impossible even theoretical criticism from foreign rivals of that standard of structural safety which has been so well demonstrated in the past by practical achievement and experience.

Extract from Design Leaflet B. 1 of A.P. 1208

(7) Mechanical tests are considered to constitute the final proof of structural strength, but in most cases calculations will be sufficiently accurate and more convenient than mechanical tests. All calculations and mechanical tests are to be carried out in the light of the following requirements:—

- (a) That any standard structure or component shall not collapse before withstanding on strength test the specified unit external loading multiplied by the specified factor. This factor will be referred to as the *ultimate* factor.
- (b) That any standard structure or component shall be capable on strength test of carrying, for a period of one minute, the specified unit external loading multiplied by 62.5 per cent. of the specified ultimate factor, during and after which it shall still be in an airworthy condition. This 62.5 per cent. of the ultimate factor will be referred to as the *proof* factor.
- (8) The factors quoted in the following Design Leaflet are ultimate factors, unless otherwise stated.
- (9) A standard structure or component is defined as a structure or component only just complying with the minimum dimensions admitted by the drawings (allowing for all limits and tolerances) constructed throughout of material only just complying with the minimum requirements of the material specification. Standard compression members, in addition to satisfying the above conditions, have the maximum allowable eccentricity.
- (10) Any generally recognised method of calculation may be used in estimating the strength of any given structure, and credit may be taken for all redundancies, provided sufficient information is available as to the effect of such redundancies. In doubtful cases, appeal may be made to strength tests either on complete units, or on individual members. In general, the structure or component tested will not comply with the above definition of a standard structure or component, and hence corrections, based upon actual measured dimensions and material control tests, must be applied to the factor at which the specimen broke on test. These corrections may be waived if the factor given by test is at least 20 per cent. greater than the specified factor.
- (11) Correction of test results to standard component conditions will usually only be possible when the item tested is of simple design and fails in a manner to which the specified material properties are directly applicable.

In other cases, it will be necessary to obtain on test factors 20 per cent. greater than those specified. In the case of a test on a complete unit, a convenient procedure, when practicable, is to patch up such members as fail prematurely, and to continue the test up to the 20 per cent. excess load. Corrections to standard component conditions need then be applied only to the members which fail before the full 20 per cent. extra load has been applied.

(12) Compliance with the proof factor requirement should be checked, both when approval is based entirely upon calculations, and when recourse is had to mechanical tests. In general, this will not involve any extra calculations.

Definition of New Load Factors

The new definitions of British load factors are set out in full in the extract from Leaflet B.1 given above. It will be seen that these definitions lay down a much more exact—and exacting—standard than would be implied in the mere statement that a typical aircraft must not break up under the load corresponding

to the ultimate factor. Under a regulation to that effect it would be quite permissible for constructors to make their specimens for test—either complete aircraft or components—out of materials as far as practicable in excess of specification minima in both strength and thickness. It would also be quite permissible—although undesirable from every point of view—for an aircraft so tested to suffer from permanent deflections at an early stage in the loading. Both these troubles have been carefully guarded against, the one by the definition of a "standard" specimen and the 20 per cent. margin on the test of a typical specimen, and the other by the institution of the proof factor. Neither of these ideas is a new feature of British airworthiness methods, but both are now for the first time incorporated in the Civil Airworthiness Handbook—and incidentally it is believed to be the first time that the idea of the "standard" specimen has been incorporated in the airworthiness regulations of any country.

The relentless striving of our Airworthiness Department after accuracy of detail in their methods has often caused—and doubtless will often again cause—considerable irritation among designers and constructors. It is all to the good, however, that the full refinements of this meticulous system should be published and expounded in order that users of British aircraft all the world over may appreciate the theoretical as well as the practical worth of a British Airworthiness Certificate.

There is, however, one grave danger in the operation of the new system which must be avoided if British constructors are not to be handicapped rather than helped by the high standard of our airworthiness regulations. The factors now laid down are so high that it is essential that they should be treated as genuine *ultimate* factors. All possible steps must be taken to avoid those "hidden margins" which are no longer necessary for strength and which would therefore merely lead to waste of weight and consequent commercial inefficiency of our aircraft structures.

Neither designers nor stress-men have any control over the hidden margin due to materials being over strength and over size, and the 20 per cent. requirement on typical test specimens shows that the Airworthiness Department anticipate a large effect on this account. This is all the more reason why full account should be taken of all redundancies, and extra allowances of strength customary in the past should no longer be incorporated.

Above all, the Airworthiness Department itself should—and undoubtedly will—revise the letter of all its own minor regulations and specifications in the spirit of its new major requirements.

Values of New and Old British Factors

Apart from the newly instituted "gust" cases which will be the subject of separate consideration, the two principal stressing cases are those known as "C.P. Forward" and "C.P. Back." The new ultimate factors and the new proof factors for these cases are plotted in figures (1) and (2), together with the old British factors which they have superseded. The numerical increases for aircraft of any weight may be readily seen from these charts.

The values of the normal ultimate factors have been taken from the I.C.A.N. regulations and consequently the only point on which we have a specifically national grouse is the application of such high acrobatic factors to aircraft of all weights. Fortunately, nobody is likely to want large transport machines designed for acrobatics, and so little difficulty is likely to be experienced on this account in practice.

Conclusion

It has been no part of our intention to consider whether it is necessary to have such full and detailed regulations for civil aircraft, but having accepted their existence to see how well or ill the new regulations fulfil their purpose. On so complex a subject it would be foolish to dogmatise, but the following conclusions represent one considered personal opinion.

(1) A more exact definition of the load factor require-

ments was desirable to enable the British and Dominion Governments to enforce uniform conditions throughout the Empire.

(2) The adoption of higher numerical factors was desirable to avoid technical criticism by our customers abroad.

(3) The increases in strength demanded by the new figures and methods in combination are not so great as to constitute any serious criticism of our past practice.

(4) The new system is strict, but logical, and is capable of reasonable operation without marked increase in structure weights.

Finally, it is desirable to make clear that the writer would oppose as strenuously as anybody else any attempt to impose the new numerical scale of load factors in conjunction with the old assumptions. If there should be failure to operate the new system on the lines envisaged above, the conclusions given would require drastic revision.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

EARLY FIRST SOLOS

[2880] A report in a recent issue of FLIGHT on a very early solo by one of the *Daily Express* pupils, prompts the writer, who was one of the many unsuccessful candidates, to suggest that an account in your columns of the adventures and progress of the 10 or 15 successful candidates would be particularly interesting.

These men are presumably of rather more than average aptitude for flying, and an analysis of their performances up to, say, first solo or first tests would be valuable to those others of us who have no guidance as to the normal cost and time of learning to fly.

I have held the idea that it should be possible for an average pupil to achieve first solo, on a modern machine, for an expenditure of £5, and I should be more than interested to have this opinion confirmed or otherwise by an analysis of the kind mentioned.

CYRIL A. KAYE.

Sheffield.

October 1, 1933.

THE PIONEERS OF FLYING

[2881] As the wife of an R.F.C. officer of the early days of the war, and one who took a great interest in pre-war aviation, I would like to draw attention to the efforts of our early pioneers. Without any disrespect to the Lindberghs, Earheartes, and Mollisons, I would like to suggest that people who admire the money-making aviators of to-day should pay a visit to the Science Museum at Kensington and there spend a few moments contemplating the machine, a Vickers "Vimy," in which Alcock and Brown flew the Atlantic in 1919. That should give food for

thought. At the same time, a few moments given to the memory of some of these early efforts, when flights of this description carried very little monetary reward and 1 per cent. chance of success, would not be wasted.

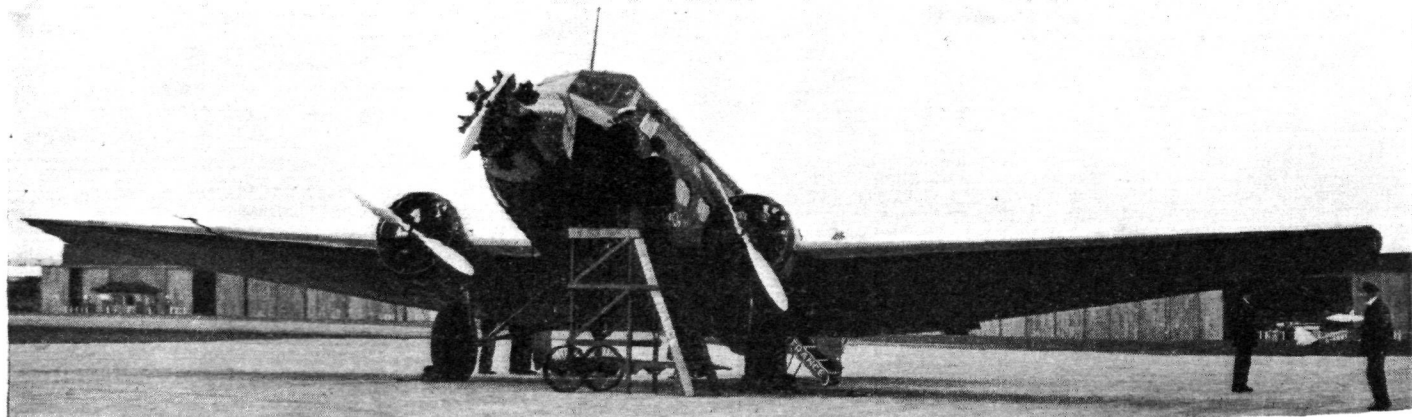
It seems to me, having seen boys of 18 during the war sent to France after about 2 hours' dual in machines which I very much doubt our modern airmen would even take off the ground, that too much notoriety and cash awards are the order of the day. I am not in any way belittling flights such as the one to Cape Town by the two gallant R.A.F. men in the Fairey monoplane, which was a remarkable achievement and received surprisingly little publicity.

Not only do I and many others object to this almost "sob stuff," film star adoration, but we feel it an insult to the memory of those who made aviation what it is to-day—those who flew, not with one eye on the financial gain, but for the sheer love of clean adventure, which seems so fast dying out, or for the love and protection of their country and fellow-men. It seems a great pity that the cheering crowds that stand outside our palatial hotels to catch a glimpse of our famous and wealthy record-breakers could not have had the honour of standing with me on the cold and early dawn on a small aerodrome awaiting the return of a handful of boys sent up to attack the enemy over London. There were no cheques, functions, or cheering crowds awaiting the return of these boys who, with indifferent machines and with very little training, had dared and done something infinitely greater than any of the feats of our modern heroes and heroines of the air.

Worcester Park.

October 10, 1933.

ENID GREENWOOD.



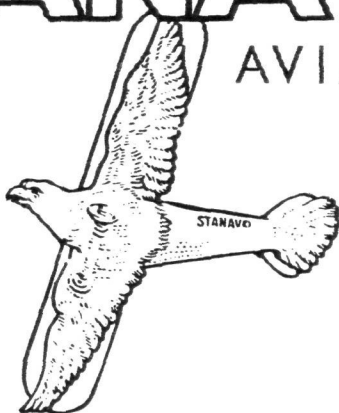
THE "GOLDEN CLIPPER" AT CROYDON: The Wibault Penhoët of Air-France about to leave for Paris. Owing to a confusion in the rate of exchange in the "Gold Standard" it was stated in our issue of September 21 last that the "Golden Clipper" was a Loire et Olivier—of course, the latter class are "Golden Rays." Just a little Golden Slipper on our part! (FLIGHT Photo.)

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PRIVATE OWNERS, ARE WE THE LAST OF OUR RACE?

By a Private Owner

This article, which is from a pilot with considerable experience of legislation matters affecting private flying, raises many points of vital interest to those who use what are usually termed privately-owned aircraft

There will in the future not be enough room in the air for indiscriminate flying in all directions, and therefore flying must be confined to routes. One is going to make it not impossible, but certainly difficult, for the private owner to fly as he wishes, but one must consider his requirements only in relation to regular air transport craft to which priority must be given.—Extract from the paper by Maj. R. H. Mealing (see page 1049.)

THESE words are a threat to the future of private flying. It is not Maj. Mealing who is threatening us. He will not think me rude for saying that there is nothing very startling or original in his paper; he admits that himself. His paper is an admirable exposition of work done by an imaginative, broad-minded and conscientious man. In the course of his work he reaches certain conclusions. It is those conclusions which constitute the threat.

Similar ideas have been voiced before, and I have been called a pessimist for repeating them. Ostriches argue like that. It seems to me essential to face the possibilities of the future, however black, in order to elaborate a workable scheme for overcoming such difficulties as may arise. I have at the moment no scheme to offer; my contribution is to put forward a few disjointed ideas in the hope that better brains than mine can define and solve the problem. Amateur pilots have had their small value to the aircraft industry and to the nation that subsidised them. Is it over?

Are the main principles governing future air traffic control as enunciated by Maj. Mealing correct—or, rather, probable? We shall have little difficulty in agreeing that the air will be increasingly controlled, whether all of us wish for this or not. Is it going to be controlled in the interests of the flying charabanc?

Commercial aviation is going to find it much easier in the near future to take money out of the pockets of people who are flown than out of the pockets of those who fly. There are a great many more of the former, because they do not have to have so much money and no demands in the way of physique or skill are made upon them.

This is only just beginning to be appreciated in these islands. Until this year, the little civil flying that there has been in this country has been mostly private flying. I exclude joy-riding, which gets no one anywhere. We have had fun and freedom and, in idle moments, dreamed of the coming of thousands of private owners flying anything between cheap low-powered aeroplanes calling for little skill up to high-powered luxury cruisers for those who could afford them. This demanded a flourishing industry, good service stations, brisk second-hand markets and frequent and convenient aerodromes.

At one moment in 1933 there were operating in England fifteen air lines that eighteen months before had not existed. Where there were fifteen this year there may be thirty next. People are beginning to be flown. The bogey of the flying charabanc has raised its head.

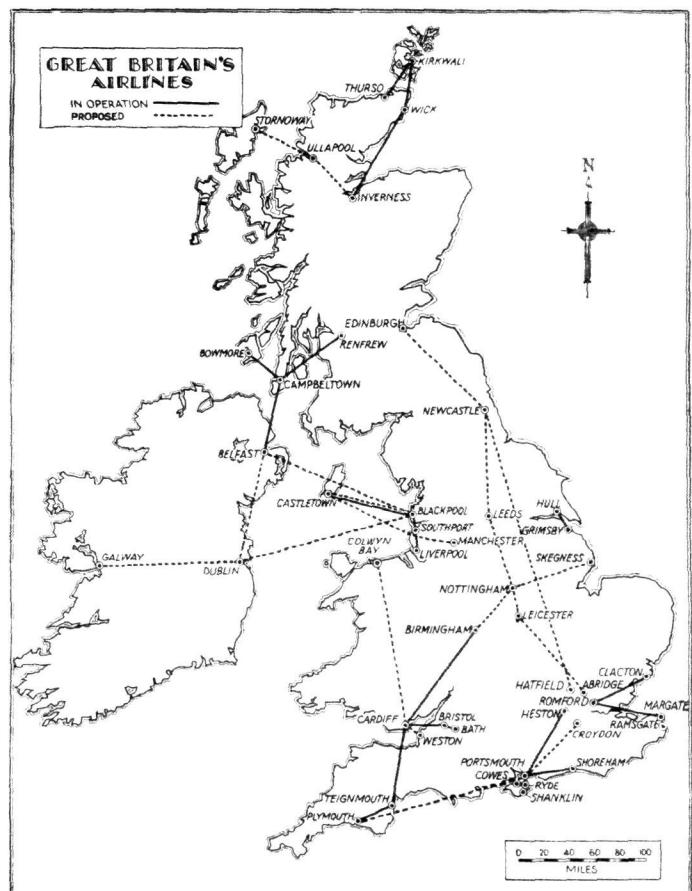
We must now examine the beast. The early days of the flying charabanc in England are going to be difficult, because of our winter climate. The overheads of an air line that lies idle during the winter are likely to be too heavy to let it pay. If it is active during the winter, it is likely to be irregular or dangerous, and that will not enable it to pay.

To make the flying charabanc a commercial success it must fly with 100 per cent. regularity. As it is more affected by bad weather than any other form of transport, it will have to devote more thought and money to overcoming this difficulty than surface transport has found necessary. If it is successful, it may become the form of transport that is less dependent on the weather than any other. This will probably only be achieved by means of elaborate equipment and strict control along each air route. The air charabanc monster begins to stir dangerously.

Is this reptile likely to be powerful? This is a question of vested interests. The regular air line will be a costly thing because of its ground equipment. It does not appear likely that the taxpayer will have to provide this for national air routes, and many of the 1933 summer air lines cannot afford it. But the railways might be able to do so. It would be silly for them to undertake air operation on a territorial basis; they will have to pool their air activities. With their millions of capital, it would be open to them to secure control of the airports most suitable for their purposes. At and between these, they can establish their elaborate equipment and control, denying it, very naturally, to the independent non-regular competitors, who will consequently be unable to compete.

Some of the railways' competitors, however, may be both stubborn and rich enough to lay down their own ground control, with the result that there will be rivalry between the regular air lines. They will multiply and cross each other and then there will be an accident or two. By that time there may well be a National Transport Board controlling all surface transport; following a Government Commission, the N.T.B. might take over the control of the air lines. If it did not, some other body would, the important point being that the effect would be roughly the same as if every aerodrome was Government controlled and like Croydon Airport, or worse.

If development takes place in anything like this manner, the vested interests behind the flying charabanc will be most formidable. With this article is a map showing the air lines in the summer of 1933. They only ran where surface transport was really slow. With air speeds of only 100 m.p.h., little else was worth while. Maj. Mealing forecasts speeds of 500 m.p.h., but 250 m.p.h. would be quite enough to change the appearance of FLIGHT's map. It would then be crossed and re-crossed with a network of controlled air routes.



Sketch Map showing the internal airlines of Great Britain

So far we have only envisaged the development of a multitude of well-organised aerodromes and ground services. For the facilities provided in the past for the regular air lines the private owner has cause only to feel grateful. He found aerodromes, emergency landing grounds, weather reports and refreshment bars. Liners with wireless, albeit unwillingly, sometimes showed him the way. The future seems to offer still more of the same stuff. But does it?

Somewhere it is written: If you kill yourself it is sad, but if you hit an air liner it may be 42 times sadder still. The most bigoted private owner must agree that it is unthinkable that a liner containing any number of helpless passengers should be jeopardised by Tom, Dick or Isidore airing his girl. If Isidore were killed, the commercial effect on private flying would be negligible. If 42 passengers are killed, air transportation is quick to feel the draught. Not only may there be 150 passengers on board the air liner of the future, but the speed will most probably not be 95 m.p.h. At 500 m.p.h., with the not uncommon visibility of 3,000 yards, the pilot has eleven seconds to avoid a stationary obstacle, but if it is moving perhaps less. From the point of view of finance and humanitarianism, Maj. Mealing is surely right; the air charabanc takes precedence.

But is there no room for the private owner as well? At a price, yes; will he pay it? In the thousands that are needed for us to be able to buy cheap aeroplanes, probably not. On the roads there are seven people killed every day. Our private owners are recruited from the roads. Would the railways give them running rights in private cars on the permanent way? And the railway line is a much less delicate job to control than the air line of the future.

It is an entertaining way of spending a few minutes to visualise conditions on the future air routes. It sounds easy to allocate to different classes of traffic different heights at which to fly. In England, when the clouds are 1,000 feet, it's a grand day. To be allotted anything under 8,000 feet may mean that you are flying blind the

whole way. Flying blind, you must have an *absolute assurance* that there can be no one in the way.

The control of all that, as Maj. Mealing says, is easy compared to the work of getting the traffic on to the aerodrome. The 2, 4, 6, 8, 10, 15 thousand feet categories of aeroplanes are then all converging not only to one level, the ground, but to one point, the aerodrome. Bill Jeffscombe in the control tower is going to be too busy to be tolerant of anybody who makes his responsible work unnecessarily difficult.

Everything will not always go according to plan, and he must be able by wireless to make necessary changes. He must be sure that orders will be obeyed correctly and promptly. Unless all the pilots are really skilled and disciplined, there may be bloody chaos and flames.

I can think of a dozen amateur pilots who, by temperament, could be trusted to fly on such an airway, not once, but all the time. I don't want to count the others.

To-day there are not 500 private owners in this country. There will not be cheap private aeroplanes until there are over 50,000 of them. On busy days there are sometimes 30 private aeroplanes at one aerodrome. Figure out what there ought to be in the future and remember what it looks like to have 100 on an aerodrome at one time. Remember that at the King's Cup Race this year, private owners were asked to keep away during the race. Multiply the speeds of aircraft by two, or even three, and add plenty of vast air liners that need a lot of aerodrome. Lastly, imagine that the aerodrome is at Wigan or Stoke-on-Trent. All these difficulties we must face if we are to have progress.

These ideas, as I said, are disjointed, and they appear to be gloomy and pessimistic. I cannot worry about that. I think we shall have problems of this kind to face. About their solution I have at the moment only one belief, and that is that they will be solved by mechanical ingenuity and not by human education. I hate history, but it does teach us one valuable lesson; we can always make things, but we can seldom teach ourselves how they ought not to be used.



THE ORIGINAL "PUSS MOTH"

ASIGHT to see is the original production "Puss Moth" which has now come back to the de Havilland works for repair—and it needs it! After being flown out to India by Mr. A. Irwin with the owner, Mr. Gandar Dower, it was left in that country to be flown in the Viceroy's Cup Race by Mr. L. H. Mason, the instructor of the Madras Flying Club. On the way back to Madras one day after the race, Mr. Mason saw a large hail storm approaching, so he landed and waited. It was as well he did so, for there are now holes over one and a-half inches in diameter through the plywood leading edge of the wing, holes of even greater size through the webs of the spars, the fabric looks as if it had been attacked with a pitch fork, the Triplex wind-screens are cracked as if by bullets, the engine



"HOLEY": This happened on the ground in India, a country where they apparently get real hail storms.

cowling is dented all over, but the cellophane cabin roof is *unharméd*. That hail must have been as big as the proverbial hens' eggs. Just in case you don't believe the story, look at the photograph!



Sweden's Air Ambulance Service

ONE of Sweden's "Flying Samaritans," the Lappland aeroplane ambulance service, recently saved the life of an old Lapp woman by a daring flight through darkness and fog across the Northern wilds. The Ambulance station at the fortress of Boden received a call from a Lapp camp situated in a distant and isolated district of the country. Sgt. Gunnerfeldt at once set out in his machine, collecting

a doctor on the way. A thick fog combined with the darkness of the night, however, compelled him to make a forced landing on a lake. In the morning he started off again and reached the encampment at 6 a.m. By 11 a.m. of the same day the woman was in hospital, her life almost certainly saved by the speed of air transport. Aviation has added to the terrors of mankind, so it is only fitting that it should minister to its suffering.

ENGLAND to AUSTRALIA *record flight*

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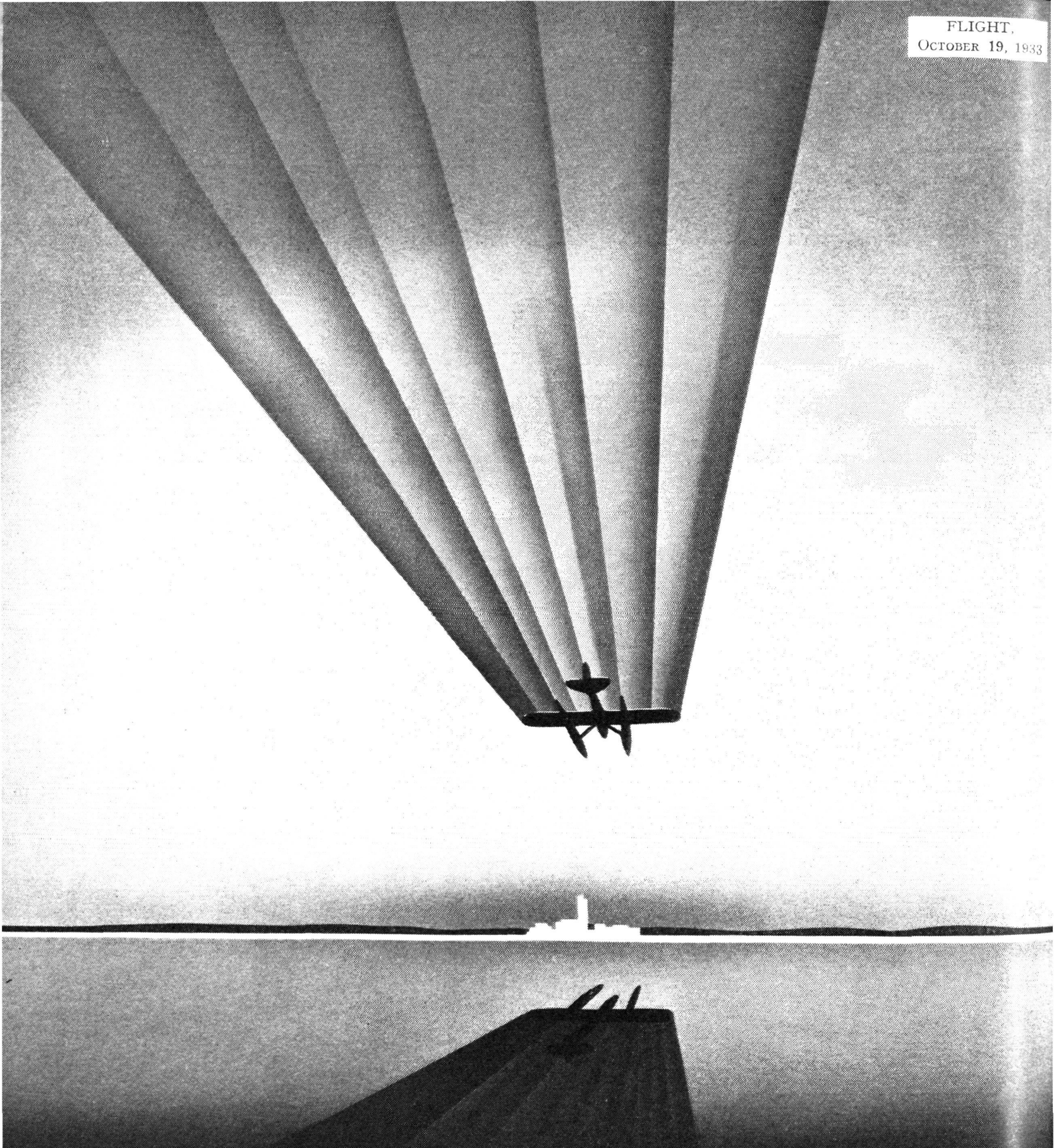
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WORLD'S RECORD SHATTERED

391 M.P.H FOR 100 KMS ON CASTROL

Flying over a triangular course between Ancona, Pesaro and Falconari on October 8th, Colonel Casinelli broke the 100 Kilometre speed record in the World's Fastest Machine (the Macchi Castoldi-Fiat which attained 423 m.p.h. flown by Warrant Officer Agello who also used Wakefield Castrol—the World's Fastest Oil).

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AIR TRANSPORT

AIR TRAFFIC CONTROL

By MAJOR R. H. S. MEALING (Chief Technical Assistant, Directorate of Civil Aviation, Air Ministry)

Major Mealing's paper is of considerable importance in that it is in effect the first public announcement of the Zone Control system. It has been found impossible to keep incoming and outgoing aircraft to separate routes when one of the valleys, leading through the Redhill range of hills, south side of Croydon, is closed by low cloud. The Zone scheme, designed to overcome this, is first being tried out on a voluntary basis, and will, if successful, be made compulsory later

Lecture (abridged) given on Thursday, October 12, 1933, before the Royal Aeronautical Society, the 566th Lecture delivered before the Society since its foundation on January 12, 1866.

BEFORE one attempts to define the problem, one must divide the subject into two parts:—
(a) The control of traffic in the air;
(b) The control of traffic on the ground.

It will be agreed that the control of traffic on the ground is analogous to the control of maritime traffic in the vicinity of harbours.

But the control of traffic in the air is not analogous to any other form of transport.

There is no other vehicle used in transport which cannot stand still when necessary, and from the incapability of an aeroplane to remain stationary arises the risk of collision with another aircraft or with some obstruction on the ground should it be flying so low.

The aeroplane suffers from the disadvantage that within the limits of its power to climb, it can fly at any horizontal plane, thereby seriously complicating any system devised to avoid collision.

I will show, however, that we have learnt to make use of the varying heights at which aircraft can fly to simplify the method of control.

Control in the air and control on the ground are closely related, as it is a basic rule that priority must always be given to the machine in the air, and a machine on the ground must not be allowed to endanger the machine in flight.

Beyond that one must treat control in the air and control on the ground as two separate entities.

Having regard to the necessity of air transport proving itself, not by speed alone, but always by regularity, there will in the future not be enough room in the air for indiscriminate flying in all directions and therefore flying must be confined to routes.

By confining aircraft to routes one can establish ground facilities in a better manner, and the more easily control aircraft to avoid collision.

Attempts have been made, and more will be made, to introduce a system of automatically indicating to one aircraft the presence, location, and even the bearing of another aircraft; but I am not convinced that, although it might be made subsidiary to the system of confining aircraft to routes, it can of itself solve the problem.

Confining aircraft to routes is going to make it difficult for the private owner to fly as he wishes, but one must consider his requirements only in relation to regular air transport craft to which priority must be given.

This proposed method of confining aircraft to routes is not a theory, but is done every day in bad weather on the Croydon-Continental route, and has stood the test of time. My theory is nothing more than an extension of that practice. The problem becomes one of controlling aircraft along an airway and then in the vicinity of an aerodrome.

When aircraft are following an airway it is not difficult to keep them at a safe distance from one another by instructing them to fly at different heights. Even that method can, due to the varying speed of aircraft, reach saturation point, but it will suffice for some time to come.

One should now suggest what aids and facilities are required to enable aircraft to follow fixed routes. The most necessary is wireless. Another, very necessary for night use, is light beacons. The wireless is mostly of the direction-finding type, excellent so far as it goes, but I cannot believe that it can be as efficient as the radio beacon, particularly the visual directive type.

We have turned our faces against the aural type, as at

the time when a pilot must be mentally alert it must tend to distract him to have a continual series of noises in one ear and then in the other.

The visual directive type enables a machine to follow a route, and will lead it very accurately to the aerodrome from a range of up to one hundred miles, but by itself it cannot do more. It is necessary for a pilot to have indicated to him at frequent intervals where he is along that route.

This will be by the use of short range marker radio beacons, each emitting a different signal.

Light beacons are used in the same manner, and though I have heard it suggested that they are superfluous, I do not agree. Should any of the radio beacons fail, they can act, at night time, as a useful substitute.

Provided aircraft are: (i) Confined to routes; (ii) are safely spaced along that route, and (iii) fly at different heights, I see no cause for fearing collision.

I have so far dealt with the operation of the machine itself, but I have yet to suggest how that control will be exercised.

It rather seems that all routes will be divided into sections with a control officer in charge of each.

Each control officer will have in front of him an indicator telling him where each machine is and its height along their own section of the route.

Where routes cross, as they must somewhere, there arises the necessity for aircraft, on different routes and on points where they cross, to fly at different heights.

This method must, however, become complicated if all aircraft of greatly varying speeds follow the same route, therefore by the time we have the mail carrier and fast passenger aircraft flying at 500 m.p.h. and yet are obtaining useful service for carrying cargo from the old air tramp which might continue to fly at 200 to 300 m.p.h., we must consider either that these two classes fly on different routes or that possibly the fast machines will fly very high.

When we do reach such speeds it is going to be more necessary than ever to prevent indiscriminate flying and the natural corollary to indiscriminate flying is the confining of aircraft to routes.

The control of traffic on an airway is not going to be so difficult as the control in the vicinity of an aerodrome. It is at an aerodrome that aircraft converge, and for that reason even to-day we have found it necessary to request certain aircraft to wait until other machines have been helped in, in conditions of bad visibility.

Croydon is cursed by having the range of hills rising to nearly 1,000 ft. known as the North Downs, which act as a barrier to 50 per cent. of the Continental aircraft.

In bad weather the pilot has the choice of flying in or over the clouds above the hills and then has to come down through the clouds over a busy aerodrome, which can be most unpleasant.

His alternative is to follow the line of one of the valleys which penetrate this range of hills, and this is done regularly. That method of approach for an incoming machine is all right until an outgoing machine happens to use the same valley at the same time. Aircraft have been known to pass one another in a valley, but that is very dangerous and should not be allowed.

The most natural suggestion is to use one valley for incoming machines and another for outgoing machines—in other words, institute one-way traffic. I made the same suggestion many years ago, and only after much consideration did I admit that I was defeated.

The reason is that often one valley is closed from a meteorological point of view and the other remains open; thereby is one's system of one-way traffic defeated.

One must permit both incoming and outgoing traffic to

use the same valley, but yet devise some system of avoiding collision.

Flying up and down valleys is not ideal, but until we insist on all pilots flying blind, whereby outgoing traffic might climb through the clouds and incoming traffic remain below them, we must permit valley flying.

We have had as many as 20 machines at one time approaching and leaving Croydon, and to complicate matters their direction of approach and departure is nearly always within an angle of 90 deg. The method of control in this vicinity is one known as "the controlled zone scheme."

The scheme is one whereby when visibility is reduced to the international fog standard—namely, 1,000 yd. horizontally and 1,000 ft. vertically—the controlled zone scheme will come into force and all aircraft will, so far as is possible, be notified that the scheme is in force. It is considered justifiable to expect pilots of aircraft who cannot be told of the existence of the scheme to judge for themselves what the standard of visibility is and to act accordingly.

The zone is approximately an area of ten miles around Croydon, and within it aircraft will, during the operation of the scheme, be permitted to fly only with the permission of the control officer.

No attempt will be made to instruct aircraft to follow a certain route, but incoming aircraft will be permitted to follow a certain route only so long as they do not endanger any other machine, and failing their ability to do that will be ordered to lay-off the zone until such time as some route is permissible.

No outgoing aircraft will be permitted to depart except in such manner as to make it impossible to endanger any incoming machine.

In this control of air traffic from the ground the control of departing aircraft will be of very positive kind, but the control of incoming aircraft will be negative. No attempt will be made by the control officer to instruct an incoming machine in flight that it must approach by a particular route, but only that it must avoid entering a certain zone.

Priority must always be given to the aircraft in flight, and that is why absolute control will be exercised over the departing aircraft, but not over the incoming machine.

With the assistance of the operating companies, all of whom have acquiesced with the suggestion, we hope to institute this system very shortly on a voluntary basis and then later to establish it on a compulsory basis.

There appears to be no reason why the controlled zone scheme should not be in force at any busy aerodrome, but it is particularly necessary at Croydon.

The method of approach to the aerodrome is covered by the existing international regulations, and those regulations, having stood the test of time, might well be adhered to.

I will make a brief reference to what is being done to assist aircraft to land "blind," or very nearly so. We have not yet reached the stage of its being necessary or even advisable for pilots to land aeroplanes absolutely blindly when they cannot see the colloquial yard ahead.

But we are already contending with the problem of having brought a pilot to the aerodrome of helping him to land in conditions of two to three hundred yards' visibility, when for practical purposes he cannot see any distance ahead, but can see enough below him actually to enable him to land.

We hope before long at Croydon to be able to tell a pilot to approach on a certain bearing, to tell him at intervals how near he is horizontally to the landing areas and then leave it to him to land the machine. It may not sound very useful stated as briefly, but the pilot will know that here is nothing in the air or on the ground which, once he has commenced to bring his machine in, will get in his way.

We now come to the comparatively simple problem of the control of traffic on the ground. We have our international regulations for this, and although they could be modified, the most necessary point is to enforce the existing regulations.

That most necessary to be enforced is to cause all taxi-

ing aircraft to manoeuvre only on the perimeter of the landing area, leaving the landing area absolutely clear for aircraft landing and taking off.

One must lay down a proper path around the landing area for taxiing, but whether operating companies do or do not say they cannot afford to taxi, I am convinced that it is in their own interests to adopt this method at aerodromes where aircraft arrive and depart every few minutes.

The taxiing paths and aerodrome control exercised at the Berlin Tempelhof Aerodrome are ideal.

I have not endeavoured to suggest any detail method of control but rather to consider only the principles involved.

In conclusion, I must add that these views which I have put before you are my personal ones.

Maj. Mealing, replying to the various points raised during the discussion, agreed with Maj. Mayo that, provided a scheme could be evolved whereby aeroplanes were directed by some foolproof system of signalling, then control of landing by this means would be a very desirable feature. He did not, however, see how, when as frequently happened even at Croydon, several aeroplanes were all ready to land within a few seconds of each other, it would be possible to tell the other machines to wait while one was picked out and told to land. Maj. Mayo thereupon explained that the system of which he had previously spoken, as being carried out at the Miami airport in Florida, did not rule out the conventional circuit regulation. It merely provided a signalling system of green and red lights which were directed at individual aircraft signifying that they could or could not land, and in the event of there being several machines all ready to land at the same time, those which did not receive the signal continued to make a circuit of the aerodrome in the normal way.

In answer to Mr. Jackaman, who asked whether the vertical wireless beam as used in America for landing under conditions of no visibility was being tried out over here, Maj. Mealing said they were by no means satisfied with this method, from the point of view of safety of passengers. He felt that their first job was to assist pilots who had been brought right over the aerodrome by directional wireless and who now were left to themselves to land under conditions when the visibility was very bad, but not necessarily non-existent. He agreed also to Mr. Jackaman's suggestion that the traffic might be distributed among the other aerodromes which have been established adjacent to London. The same speaker had also drawn attention to the fact that he had found green lights to stand out better at night, and Maj. Mealing said that, although red was definitely the best colour for penetrating fog, he thought perhaps that green stood out better because there are now so many red Neon signs on shops and cinemas.

In reply to a speaker, who asked what training would be necessary for the intermediate control officers which Maj. Mealing had visualised in his paper as being necessary, he said that they would probably have to be highly trained men, just the same as were those who now undertook this duty at Croydon.

Col. Sempill had asked for the regulations which the lecturer thought necessary under conditions of clear weather, bad weather and night. The answer to the former was that the existing regulations were considered sufficient and simple enough. The main thing to which it was necessary to pay strict attention under conditions of bad visibility was to keep incoming and outgoing aircraft entirely separate, and he also felt that the same held good for night. Several speakers had queried the necessity for differentiation between commercial and privately-owned machines. Maj. Mealing pointed out that it took two machines to make a collision and that the control of one was insufficient. He therefore considered it absolutely necessary to segregate the commercial machines with wireless into well defined routes while keeping privately-owned aircraft out of those routes. He agreed that the ideal way would be a scheme whereby it was made possible to control both types, but up to the present they found it quite impracticable to permit all private owners to carry transmitting sets without which adequate control would be impossible.

Delays on the Indian Air Mail

RECENTLY the mail aeroplane bound for India was held up at Basra, first by a report that Bahrain Island was enveloped in a dust storm which made landing impossible there, and then by a similar dust storm at Basra itself.

The *Calcutta Statesman* comments that: "It is a proof of the general reliability to which the air mail system has attained that grumbles become very pointed if the mails are late two or three weeks running—even though the delay be not very serious from the business man's point of view."

THE INAUGURATION OF THE AIR FRANCE CO.

THE formal inauguration of the new company, "Air France," formed by the consolidation of all the French Air Lines, took place at Le Bourget Airport on Saturday, October 7, last. While the consolidation had been effected and in operation since September 1, owing to the recent death of M. Georges Leygues, the Minister of the Navy, this inaugural ceremony had been postponed until the above date.

The cement apron in front of the hangars at the northerly end of the airport had been roped off, and types of the different planes operated by the various companies now incorporated in the "Air France" were ranged in two rows along it. These machines included the three-engine Wibault-Penhoët *Golden Clipper*, and the twin-engine Lioré & Olivier *Golden Ray*, both well known to the patrons of the Paris-London service, the three-engine Farman *Silver Star*, which has been in operation on the Paris-Brussels, Amsterdam and the Northern Baltic Air Lines for several years past, and the Latecoere 28, of the former Aeropostale South American system. The new Breguet, three-engine, all-metal sesquiplane was also in the line, being presented to the public for the first time. It is powered with three Hispano-Wright "Whirlwind" 300 h.p. engines, giving a maximum speed of 245 k.p.h., and is equipped to carry 10 passengers, pilot and mechanic. This plane has been designed for the Paris-London and Paris-Marseilles lines.

M. Pierre Cot, the Air Minister, arrived at Le Bourget Airport shortly before 4 o'clock, having flown from Vichy in his personal machine, a Morane-Saulnier parasol mono-

plane type 230, which he piloted himself. Accompanied by M. Ernest Roome, the President of "Air France," the Minister made an inspection of the various planes drawn up in front of the hangars, during which a number of the pilots were presented to him. M. Roome then mounted the speaker's stand and made a short address. He thanked the Air Minister for having placed the Air Lines on a firm footing, and predicted a most successful future for the newly organised "Air France" Co. The flag of the company was then hoisted over several of the planes.

The Air Minister followed M. Roome, and in a brief address congratulated the various companies on having created a strong consolidated organisation. He referred with pride to the recent performances of several of the French transport planes, and emphasised the importance of commercial aviation.

The ceremony was terminated by a champagne luncheon and reception in one of the large hangars of the Air Union Co.

Among the well-known personalities present were MM. Albert Caquot, Directeur-General Technique of the Air Ministry; Louis Breguet, Vice-President of the "Air France"; P. L. Weiller, President of the Gnome & Rhone Engine Co.; Dick Farman, of Farman Bros. Co.; Henry Potez, President of the Aeroplane Constructors' Association; Louis Allegre, Managing Director, and Maurice Balazuc, Technical Director, of the "Air France."

R. C. W.

Atlantic Air Services

IN the issue of FLIGHT for February 23 of this year a scheme was described whereby an air service could be flown between Berlin and South America in five days. This scheme hinged round the placing in the middle of the Atlantic of a ship which would serve the purpose of a mid-Atlantic re-fuelling base. The boat to be so used was the *Westfalen*. This boat has carried out tests, has returned home and been re-equipped, and is now on her way back to her station in mid-Atlantic. In about three weeks' time it is intended to start a regular weekly service between Germany and South America. As was foretold in the issue of FLIGHT mentioned above, landplanes will carry mails and passengers from Berlin, and other European towns, to Cadiz, flying boats will then take them over and transport them to Pernambuco by way of the Canary Isles, British Gambia, and the *Westfalen*. In rough weather an apron will be towed behind the *Westfalen* to facilitate landing on the rough sea, and the machines will be catapulted off again. Directional wireless will be used to guide the machines to the ship. As regards the airship service across the North Atlantic, negotiations are still going on. It is hoped that by next year it will be possible to operate a regular service which will be flown by joint American and German enterprise. A large new airship is being built for this purpose, probably by the Goodyear Zeppelin Co., designed by Dr. Arnstein, who designed the *Akron*. Dr. Eckener, who has just returned from a visit to New York, had an interview with the Master of Sempill on his way back to Friedrichshafen.

Air Transport

SIR SAMUEL INSTONE, at a luncheon of the Rotary Club of London, held at the Russell Hotel, on Wednesday, October 11, spoke about Air Transport and Imperial Airways. Air mails were extending, he said, and they always had before their eyes the Government mandate to establish air transport on a definite commercial basis. British air transport was making encouraging progress in difficult times, and especially satisfactory was the growth of traffic on the Empire routes. The air mail machines of Great Britain were carrying greater average loads and covering a bigger average mileage per machine than those of any other country, and they could claim that they had the finest civil air service in the whole world to-day. The regular passing of the mail machines was proving very useful to officials in verifying statements made by natives who were apt to judge time by the passing of the last mail machine. Even animals were getting used to aeroplanes, and did not now take much notice when they went over, except the lion who still resents aerial intrusion. It was the policy of Imperial Airways to apply a gradual speeding up to their services. On the Indian route to Karachi the time had been reduced to

six days, and on the African service between London and Capetown to 10 days.

New Soviet Air Routes

AN air line in the Archangel region extending from Kotlass to Troitsko-Pechersk, via Siktivar, a distance of 800 miles, is to be put into operation in the near future. An exploring party in the Pechora Basin is already surveying the route. Air communications during the winter months is of tremendous importance to this district, which is practically without roads. The flight between Kotlass and Pechersk is expected to take eight hours. Under present conditions it takes 19 days to make the journey by water route. It is also announced that a new Russian air line has been started, which will run from Khabarovsk on the Amur River to the island of Sakhalin. The route, with stopping places, will be throughout the Maritime Province, in which Vladivostok is situated.

The Graf Zeppelin

THE *Graf Zeppelin* left Friedrichshafen during the evening of Saturday, October 14, on a triangular flight to Rio de Janeiro, Chicago, and across the Atlantic to Europe. The *Zeppelin* will be at Chicago for the exhibition. The Master of Sempill is one of the passengers.

Plymouth-Croydon Air Service

It is reported from Plymouth that negotiations are in progress between Plymouth City Council and an airway company for the establishment of a daily service between Plymouth, Southampton and Croydon.



AN ECHO OF SUMMER: Our picture, taken last summer, shows Mr. F. L. Luxmore (left) and Mr. L. M. J. Balfour, Directors of Portsmouth, Southsea and Isle of Wight Aviation, with Mrs. Luxmore taking tea at Portsmouth Airport. (FLIGHT Photo.)

AIRPORT NEWS

CROYDON

IT is probable that a record was broken at the Airport of London one day recently, when some 60-odd passengers passed through in five minutes. First came an Imperial Airways "Heracles" with 27, closely followed by two Sabena machines carrying eight apiece. An Air-France "Golden Clipper" left with 10 aboard, and as the machine took off another of the same company landed with 10 passengers. It speaks volumes for the speed with which Airport Customs and emigration officials work, and for the organisation of the companies themselves, that the passengers were on their way to London in the various companies' vehicles in a remarkably short space of time.

The popularity of swift air travel to the East was strikingly demonstrated one day last week, when an air cruise to Cairo was arranged by Imperial Airways, Ltd., for *Helena*, an aeroplane due for delivery in Cairo. When Capt. Walters took off every place was booked and occupied. There can be no doubt that "air all the way" is preferred by an air-minded public which wishes to have done with trains whenever an air alternative exists. Record trips by scheduled air services, performed by regular pilots with standard air line craft, are perhaps best regarded as "newspaper fodder" as a rule, because they depend of necessity on a strong following wind. Nothing is ever said of the late arrival on the same day due to the same wind blowing in the opposite direction. There is something to be said, however, for the air-line pilot, like Mr. Bax, of K.L.M., who on Tuesday of last week made the journey from Croydon to Waalhaven (Rotterdam) in one hour and nine minutes, thus beating the previous fastest time by three minutes. His machine was a standard Fokker F.12, PH-AID, named *Duif*—in English *The Dove*. Before leaving Mr. Bax made a very careful study indeed of the strength of the upper winds, and flew at exactly the height at which he would travel fastest. Curiously enough, the same scheduled service the following day—with another F.12—was flown in one hour and ten minutes. On board was Sir Henry Deterding, who expressed his gratification. Mr. Rogers, one of the oldest

of the Imperial Airways pilots, made an experimental landing in conditions of poor visibility along the neon strip which is let into the ground under glass at this airport last week. His observations are of interest. Conditions were slight fog, visibility 800 yd., but it was also dark at the time. At 4,000 ft. he could see the neon light perfectly, but at 2,000 ft. he completely lost sight of it. When coming in to land, however, he picked it up again, and was able to land along it with perfect ease. He concludes that it would be even more efficient if its rays spread more and were not so vertical.

An aeroplane which paid the airport a visit during the week and created much interest owing to its speedy and graceful lines was the "Couzinet" 33, F-ALMV (three "Gipsy Majors"). The pilot was M. Verneil-Pugrazeau. He brought the machine from Paris on October 10 and then flew on to de Havilland's, Stag Lane, where new engines were fitted. On October 16 he landed at Croydon again, and left for Paris the following day. The aeroplane has a cruising speed of 134 m.p.h. It is interesting to note that there is a considerable increase in the amount of delicate air freight, such as wireless parts and electric lamps. Importers of these classes of goods find that packing costs are considerably reduced owing to careful handling. The steady upward curve of freight figure lines on the various companies' graphs is a matter for congratulation. Freight seldom gets its due amount of notice, for it is a humdrum side of the activity of an airport. Air-France has followed the example of Imperial Airways, Ltd., in mounting a "flag" on all departing or arriving aircraft. The difference is that Imperial Airways, Ltd., fly the Civil Air Ensign, whereas Air-France sport the company's house flag. These flags add a note of gaiety to commercial flying, and I look forward to the day when the other companies will follow suit. I expect the Royal Dutch Air Lines will fly the company's house flag, whereas Deutsch Luft Hansa will probably affect something more official, perhaps with a swastika on it.

A. VIATOR.

FROM HESTON

WRIGHTSON & PEARSE have acquired a "Moth" ("Cirrus II"). Anyone with a licence may hire it at a flat rate of £2 a day, paying his own insurance and petrol, which in the case of a pilot of 80 to 100 hours' experience will amount to about 15s. an hour, although the former will, of course, decrease in proportion to the pilot's record and experience. Messrs. Falk and Braddel have just toured the North of France in this machine for a week, and returned well satisfied with its performance. Wrightson & Pearse will be acquiring other newer and faster aircraft for the same purpose if the demand should justify this.

The Editor of *Shell Aviation News* informs us that Mr. H. E. Evans, who left Heston on September 11 on a flight to India in a "Moth" ("Gipsy Major") arrived at Almaza, Misr-Airwork's aerodrome at Cairo, on the 26th, and left for Gaza on October 2 on his way to Karachi. Mr. Evans complained of the petty restrictions and the unnecessary documents which he had to sign *en route*, which, he said, spoilt the pleasure of flying and made life a positive burden.

Capt. Barnard and his Fokker ("Jupiter") the "Spider," landed at Heston on the 12th with Mr. R. ("Wing") Wyndham, who is to make an attempt on the record for a delayed parachute drop. He will make the drop over Salisbury Plain with Capt. Barnard as pilot.

Five places are available for passengers on the delivery flight of two D.H. "Dragons" ("Gipsy Majors") to the associated company of Airwork, Ltd., Indian National Airways, and two places on a third "Dragon" which is being delivered to Misr-Airwork at Cairo. The fare will be £50 to India, £30 to Baghdad or £25 to Cairo, exclusive of food and hotel accommodation *en route*. These are not schedule flights, and so the starting date is to some extent dependent upon weather conditions, hence the low rates quoted. In all probability the Indian machines will start about October 28, and the Egyptian machine a day or two later. About 50 lb. of luggage per passenger will be carried if all seats are filled, otherwise intending passengers will be notified of any extra luggage accommodation. All bookings should be made with Airwork, Ltd., at Heston as early as possible. Mr. Mahony, of the Misr-Airwork staff, has been sent over to England to pilot the Egyptian "Dragon."

During the nine months from January 1 to September 30, 230 new pupils have been entered in the school register. Of these, 35 have taken their "A" licences. This appears a small proportion, but it should be borne in mind that a very large number of the pupils are already pilots, and go to Heston for navigation, blind flying or aerobatic instruction, or for refresher courses in ordinary flying.

No Landing at Eastbourne

REACTIONARY opinion has evidently won at Eastbourne, as the latest aviation notice from the aviation department of the A.A. informs us that the landing ground, A.B. in the A.A. Register, is now being ploughed up for wheat, and that the schedule should, therefore,

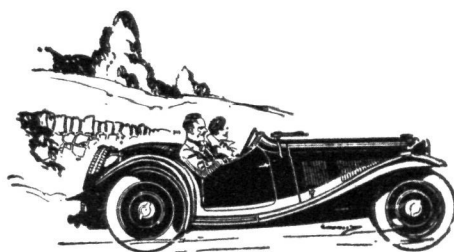
be withdrawn from the Register. We hope that Lord Ratendone's efforts will result in the establishment of another and even better ground for that town. Many people will, otherwise, soon regret that Eastbourne "is one of those old-fashioned places where we can't land. . . . dear, we had better go on to B. . . ."

SAFETY FAST!



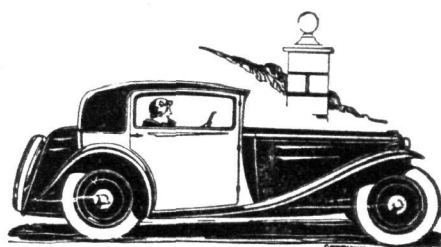
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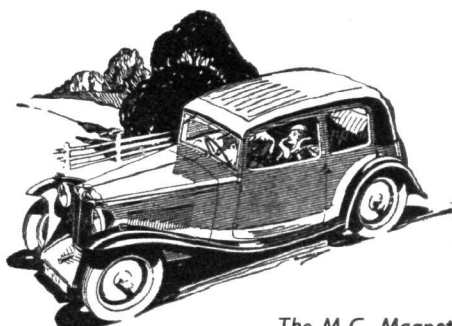
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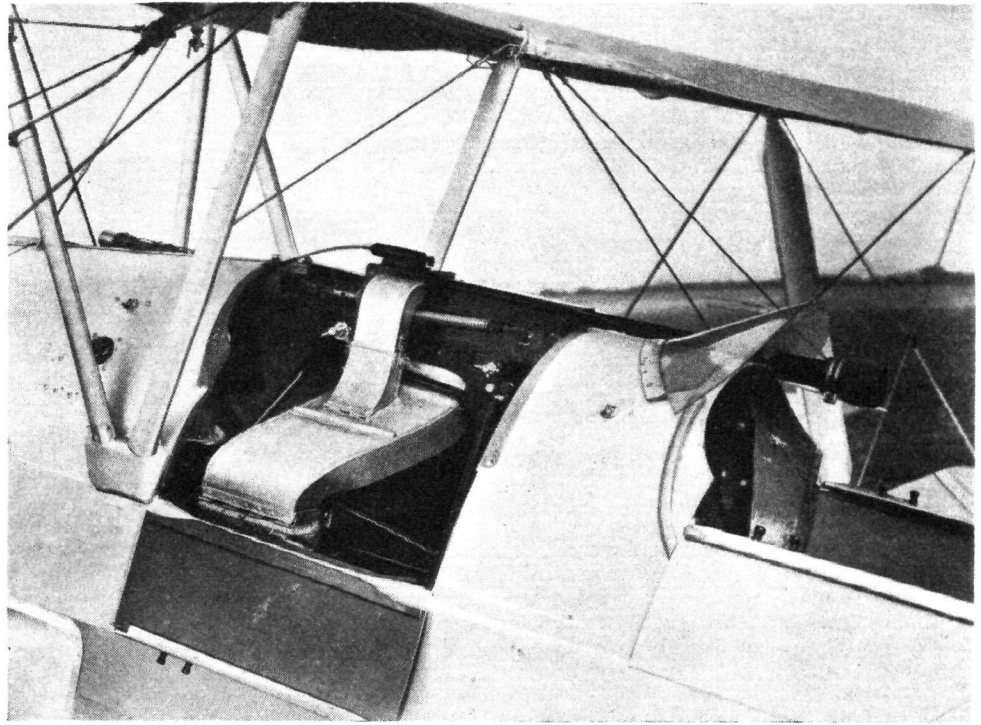


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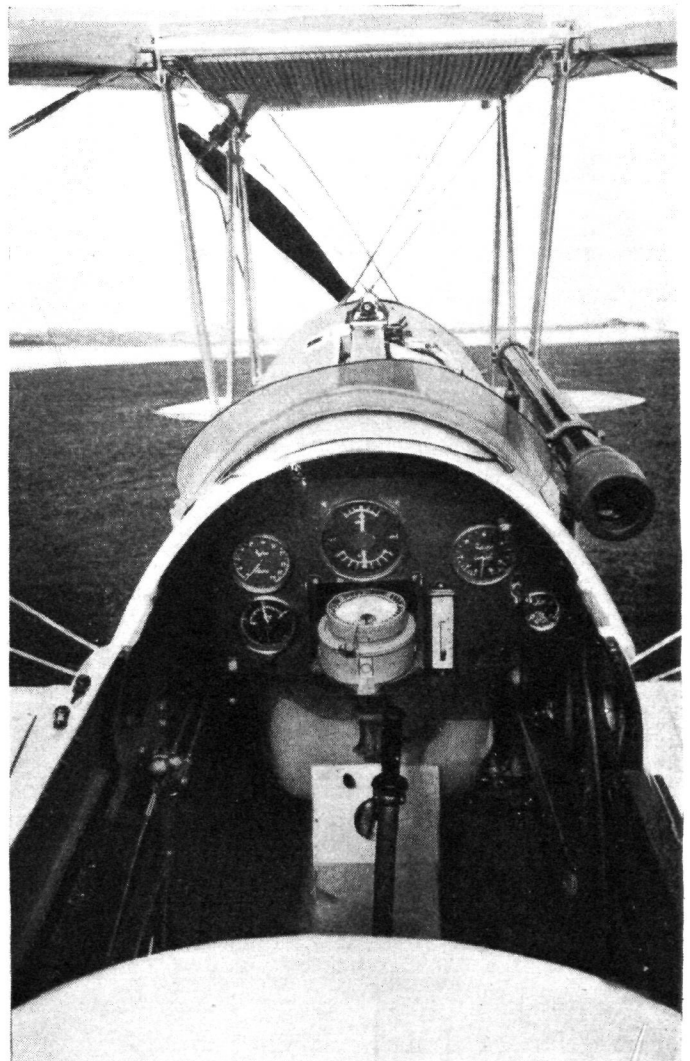
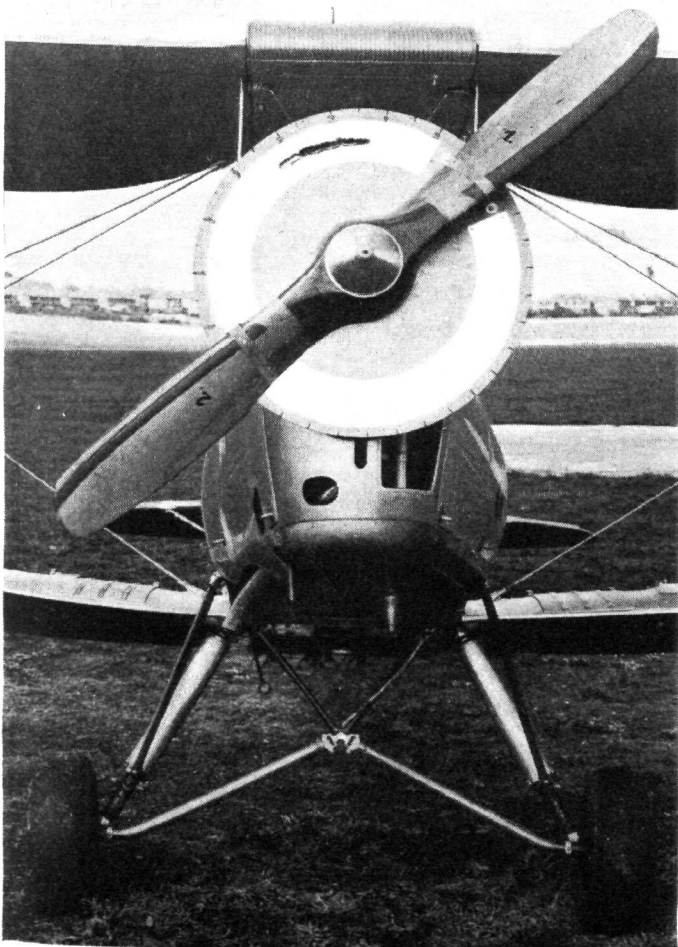
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THE "TIGER MOTH" FIGHTER

THE "Tiger Moth," fitted with a "Gipsy Major" engine, has been converted for use as a single-seater fighter. A machine gun, firing through the propeller, has been mounted on the fuselage, and slung beneath it bomb racks capable of holding eight 20-lb. bombs. With a load of four bombs the machine carries fuel for a distance of 500 miles. The machine gun, which has been tested on the machine, was manufactured by the Czechoslovakian Arms Factory, of Prague; the muzzle velocity is 839 m./sec., the maximum rate of fire 900, plus or minus 100 rounds a sec., the bore 7.92 mm., and a Pratt and Whitney synchronising gear is fitted, which is very light and efficient, the drive being taken from the top-half of the rear cover of the engine, where provision for hand-starting gear is normally allowed for. The gun is mounted in the front cockpit and shoots over the engine cowling; it is fixed to the machine mounting by two bolts, the rear bolt incorporating a vernier adjustment for direction and elevation. The ammunition box, holding 200 rounds, and the cartridge chute, are fixed to the mounting itself, the only connections between the gun mounting, and fuselage, being four holding-down bolts. The mounting is attached to the two top longerons by four bolts, but no extra holes have been drilled in the longerons. The gun mounting



Above can be seen the gun mounting on the ejector side of the gun. The top chute is for the spent belt, and the larger chute for the used cartridges; the muzzle of the gun can be seen in front between the "V" strut. Below, left, is the disc which was attached to the propeller for tests; the dispersion of the shots can be seen. Below, right, is the cockpit, showing the Aldis telescopic sight; the cocking handle is on the right and the trigger just behind the stick.



and sight can be very easily taken off by just removing eight bolts. The cocking handle is on the right-hand side of the cockpit, and is connected by a cotter pin to the lever which acts on the gun. The trigger is a little lever attached to the front of the joy stick and connected to the gun by a Bowden cable. The mounting for the sights is on the right side of the fuselage in front of the cockpit, the ordinary ring and bead sights can be fitted, or an Aldis Telescopic Gun Sight for long-distance firing. The ammunition box can be taken out and refilled without disturbing the rest of the mounting. Tests with propeller speeds varying between 800 and 2,400 r.p.m., were done

with the following results: pulling over the propeller by hand the first round penetrated the disc attached to the propeller 19½ degrees after top dead centre; dispersion throughout the entire speed range occurred between the angles 45 and 86 degrees.

The machine looks a very nice little job and should be very useful for ground strafing, for which purpose it was probably designed more than for actual aerial fighting. It can easily be converted into a trainer by the removal of the gun and bomb racks. A detachment of this machine has been ordered by a foreign Government and has already been packed up for dispatch.



THE DETROYAT-FIESLER AEROBATICS MATCH

THE international Franco-German stunt-flying match between Michel Detroyat and Gerhardt Fiesler, leading aces of their respective countries, took place at the Morane-Saulnier Aerodrome at Villacoublay (near Versailles) on Sunday, October 8, last. This exhibition attracted an enormous crowd, estimated at over 100,000 people. All the enclosures within the large field were packed, and the various routes leading to the aerodrome were jammed long before the match started. There were also exhibitions of acrobatic flying performed by the French and German aviatrixes, Helene Boucher, the pupil of Detroyat, and Vera von Bissing, who has been instructed by Fiesler. Four parachute jumps were also on the programme.

The regulations and conditions governing the Detroyat-Fiesler match were prepared by the Contest Committee of the Aero Club of France. The award of points was made by an international jury composed of Col. Del Ducca Ducca (Italy), President (the Commandant of a School of Acrobatic Flying); Maj. Willy Coppens de Houthulst (Belgium) (Belgian Air Attaché at Paris); Lt. Lecarme (France) (Test Section of the Service Technique); Herr von Beaulieu (Germany) (German Aviation Official); Maj. Burckhardt (Switzerland) (Commandant of the Dubendorf (Zurich) Air Station).

The match was divided into two parts. In the first one each pilot flew his own plane; in the second, Detroyat and Fiesler changed machines.

The first part of the match was composed of (1) a flight of 9 min. maximum duration, in which figures (stunts) designated by the jury were to be executed; (2) an acrobatic flight of 10 min. maximum duration, in which the stunts to be performed were left to the choice of the contestant himself. He was required to submit a list of the different figures that he proposed to execute to the President of the Jury in a sealed envelope, which was opened when he took off. There was no restriction placed on the altitude at which the figures in these first two flights could be performed.

Award of Points

(a) In the first flight, which consisted of figures previously designated by the jury, points were awarded according to a possible maximum of 100, 0-10 points being

given for each of the figures required to be performed, according to the skill of the contestant in executing them.

(b) In the second flight, which was composed of evolutions chosen by the pilot himself, the jury took into consideration the skill of the contestant in executing the various figures, together with their variety, originality and the difficulty of performing them.

In the second part of the match Detroyat and Fiesler changed planes and performed practically the same programme as in the first part of the contest.

To win the match one of the contestants must have surpassed the other by more than 3 per cent. of the average points awarded.

Detroyat flew a Morane-Saulnier single-seater, parasol monoplane, type 225, equipped with a Gnome & Rhone 9KBRs, 9-cylinder, radial, air-cooled, 500-h.p., geared 3:2 engine, supercharged to 4,000 metres. His plane had a maximum speed of 330 km./hr.

Fiesler piloted a plane of his own make, constructed with bi-convex wings especially adapted for inverted flying. The machine was equipped with a Walter 420-h.p., radial, air-cooled engine, and had a maximum speed of 240 km./hr.

The skill and ability of both pilots were greatly admired, but as they performed their various figures, Detroyat seemed to appear more *souple*, and executed his stunts in a smooth, continuous manner; Fiesler, on the other hand, appeared to be more studied and methodical. Amongst other figures, the sharp vertical climbs executed by Detroyat, terminating in barrel rolls, and his inverted flying, called forth especial applause. Detroyat also executed some 28 figures in the second interval of the first part of the match, while Fiesler performed only 18.

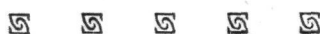
In the first part of the match Detroyat received 183 points, while Fiesler was awarded 180 by the judges.

In the second part of the match, when the contestants changed planes, Detroyat again seemed to have the advantage, as he handled the German plane more easily than Fiesler did the French plane of his opponent. He was awarded 188 points to 182 given Fiesler. This gave an average of 185.5 points to Detroyat and 181 to Fiesler. As neither had acquired more than the necessary 3 per cent., the match was declared a draw.

R. C. W.



THE RIVALS: On the left is Michel Detroyat's Morane-Saulnier parasol monoplane, and on the right is Fiesler's special aerobatic biplane, Tiger II.



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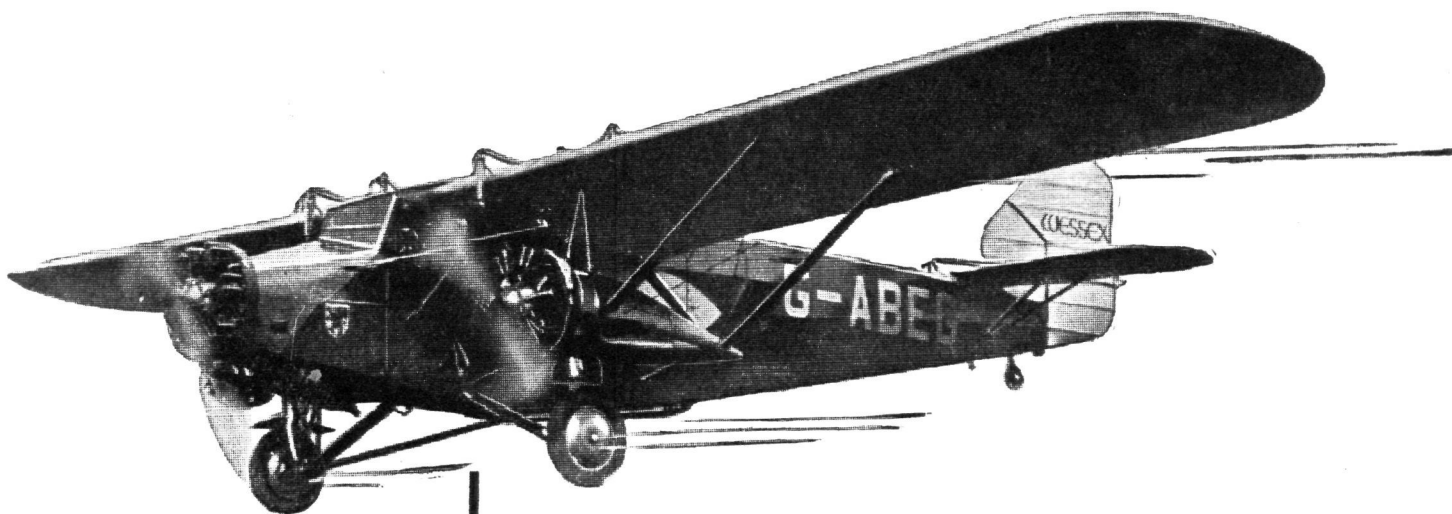
In connection with our reference last week to Mr. J. D. Rennie's work as designer of the Blackburn "Iris"

flying boats, we have been asked to point out that Mr. Rennie is, as Chief Seaplane Designer, entirely responsible, technically, for all flying-boat design.



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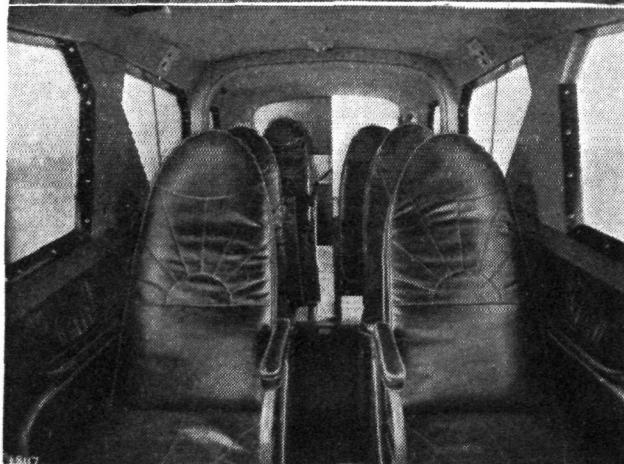
SEVEN-EIGHT SEATER CABIN MONOPLANE



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FROM THE CLUBS

HAMPSHIRE AEROPLANE CLUB

During September flying on the four Club machines totalled 214 hr. 50 min., which is 77 hr. 15 min. better than the flying time for September last year. Dr. E. R. Batho and Mr. C. H. Cook have qualified for "A" licences. On Sunday morning, September 10, a party of members flew in formation to Broxbourne in the three Club "Moths," where they had breakfast, returning home in time for normal flying. On the following Sunday, September 17, four Club machines took part in the Reading "Dawn Patrol"; Miss Wilmer succeeded in getting through unspotted, and so earned a free breakfast. During the afternoon of the same day the third Landing Competition of the year was held at the aerodrome, and was won by Mr. R. M. Johnstone, there being 20 competitors. Flt. Lt. W. G. Abrams, from 201 Squadron, Calshot, kindly consented to come over and judge. The total flying for that day amounted to 23 hr. 25 min., which is the best day's total for three years. The Southampton Corporation has been working on the aerodrome again, levelling; the surface is now very good all over. Five new members have joined the Club during the month. A series of fortnightly lectures has been arranged for the winter months; the first was held on Wednesday, October 4, the subject being "The Compass" and the lecturer Mr. K. C. Winton, the Assistant Instructor. The Eighth Annual Dinner and Dance has been arranged to take place on Friday, December 1, at the South Western Hotel, Southampton. If there be any truth in a story which has lately been told, the gentleman on the business side of the bar in the club-house must be an astute young man; anyhow, he got his money, and therein is luckier than others—many others. Incidentally, how did the Padre like his new uniform, and did he succeed in collecting the landing fee? Or had the bird flown—again? But rumour credits the Padre with the Bigger Wings.



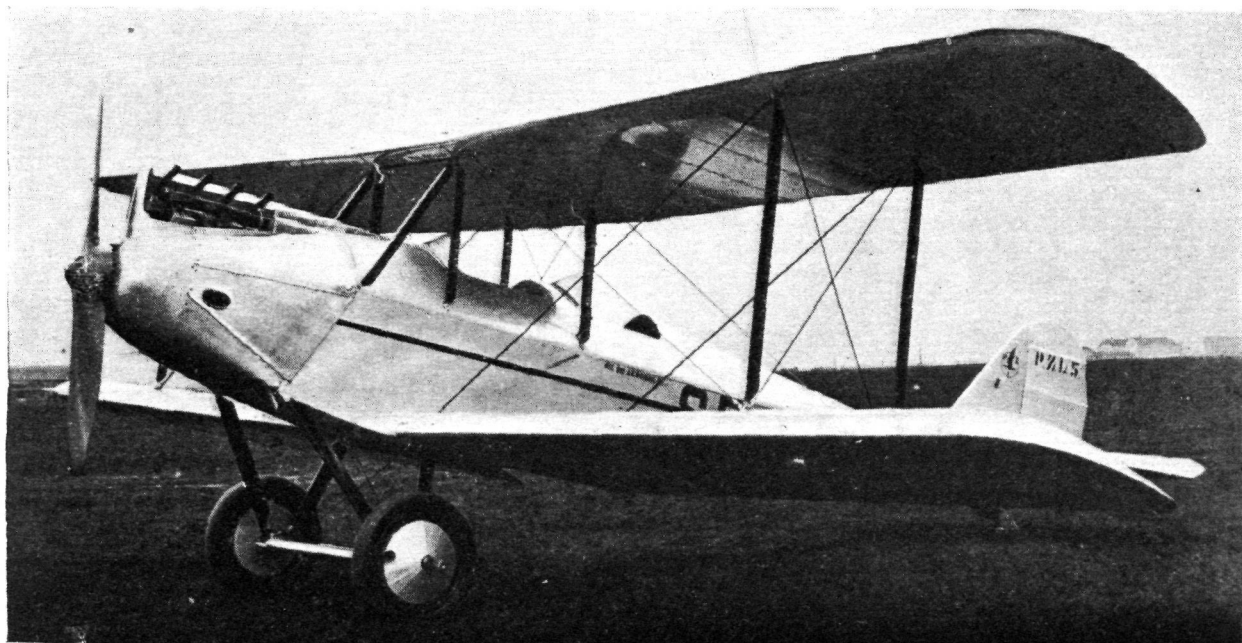
AT HATFIELD: In the foreground Mr. A. Irwin is getting into a "Moth" of the R.A.F. Reserve Flying Club, and on the left can be seen the nose of another "Moth" belonging to the Stage and Screen Aero Club.

LANCASHIRE AERO CLUB

Messrs. Green and Robinson did first solos during the past fortnight and four members qualified for Royal Aero Club Certificates. Mr. Alex Collinge, with his wife, and Mr. Gifford Hallam made a successful journey to Paris and return. The East Lancashire Branch of the British Red Cross Society, whose air ambulance is maintained by the Lancashire Aero Club, has started a winter class in first aid. A Guy Fawkes Display and Party will be held on Sunday, November 5, and on Friday, December 1, the annual Grand Ball will be held at the Midland Hotel, Manchester.

HANWORTH (N.F.S.)

Unfavourable weather has restricted flying this week. On Wednesday, October 11, Mr. Llewellyn flew Maj. Mealing to Yeovil, and Capt. Wilson Mr. Campbell to Northampton. On Friday, October 13, Mr. O. E. Simmonds, M.P., made a taxi flight to Farnborough and Margate and then round the South Coast to Plymouth, to take aerial photographs in connection with a lecture which he will



A POLISH-BRITISH COMBINATION: The P.Z.L.5 biplane, built by the Polish National Aircraft Factory of Warsaw, is fitted with a "Cirrus III" engine.

shortly be giving. Mr. Walters has been taking some of his tests for a "B" licence. On Thursday, October 12, Capt. Barnard visited Hanworth in the "Spider." On Saturday, October 14, the Master of Sempill left Hanworth for Friedrichshafen in his "Puss Moth"; he is going to join the *Graf Zeppelin* for its flight to North and South America. The Saro "Cloud," the property of British Flying Boats, Ltd., is now in the workshops for overhaul of engines and C. of A.; another interesting machine which is also being repainted and overhauled is the Junkers belonging to Mr. Lissant Beardmore.

A.S.T., HAMBLE

Ten new pupils have joined A.S.T. this term to take the three years' course which starts in September, January and May. These long courses are specially prepared for the *ab initio* pupil who is taking up aviation as a career and wishes to qualify for administrative as well as flying employment. All Air Ministry licences are included in the syllabus, and an A.S.T. Blind Flying Certificate can be acquired. There are 30 pupils in residence who are taking the two years' course for a ground engineer's licence. A "B" licence has been obtained by Mr. Hankey, and Messrs. Gardner and Hell flew the "Siskin," the latter obtaining "B" licence endorsements for the "Siskin," "Atlas," Avro "Trainer" and Avro "Tutor." Mr. Gardner distinguished himself by finishing second in the Isle of Wight Race, in which Mr. Aga, another pupil, was third. Mr. Dease added the Avro "V," "Cadet" and "Tutor" to his licence. New pupils to arrive during the month were Countess Frijs to take her "A" licence, Messrs. Appleby, Greensted, Brooks, Cameron, Rabahliati, Khadid, Evered and Penoyer for the long course, Mr. Spratt for the "B" licence, Mr. Sears for the instructional, Messrs. Dease and Wood for the "B" licence night-flying course, Mr. Penn-Hughes for the course in advanced flying, Mr. C. G. D. Williams, an instructor of the Johannesburg Light Aeroplane Club, for the blind-flying course, and Cadet Kit Mok for a special 15 months' course.

LONDON AEROPLANE CLUB

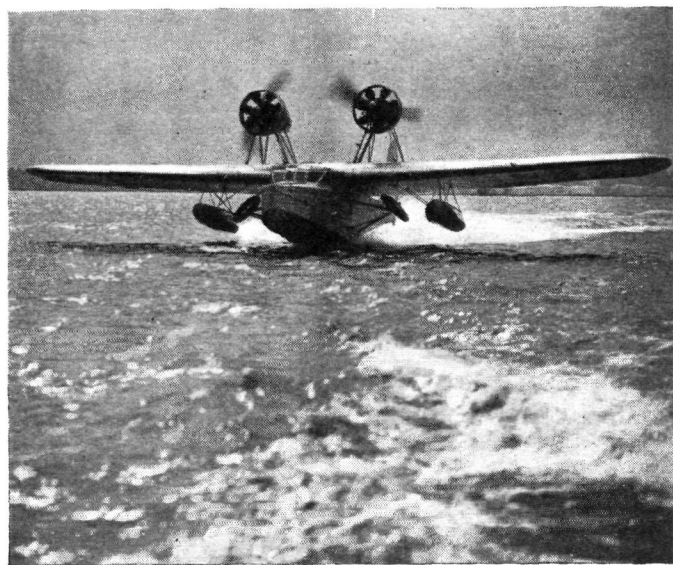
Flying time for the week totalled 55 hr. 30 min. New pupils include Messrs. J. W. Harrison and D. H. Tindall. Mr. H. G. Small has obtained his "A" licence. The restaurant will be closed for alterations from Monday, October 23, to Friday, November 10.

YORKSHIRE AEROPLANE CLUB

Gales and fog handicapped flying for four days, so that only 12 hr. was done. Visiting machines were a French Klemm and an Avro "Avian" of National Flying Services. The Club's annual dance will be held on Friday, November 24, at the Hotel Majestic, Harrogate.

BROOKLANDS

The week's activities started well, Capt. Davis being sent off by his cook two hours too early, owing to the fact that she put the clocks forward instead of back; in consequence he was at the Cinque Ports Club in time to open the hangars; since then all the staff at Brooklands take it for granted that flying starts at dawn, and are praying that Capt. Davis will speedily engage a new cook. The total flying for the week amounted to 110 hr., "A" licences being carried out by Messrs. Lizard, Withy and J. Lorentz. Theo. van Marken left for Amsterdam, taking with him two "Tiger Moths," the second being flown by Mr. Stuart Hordern. Cross-country flights were carried out to Bristol, Hamble, Norwich, Tangmere and Gravesend, and Messrs. Ahlers and Mendl flew to Vienna. New members include Messrs. Parker, Porritt, Ramchandari, Armitage,



WITH AIR SERVICE TRAINING: A R.A.F. Reserve pilot alighting on Southampton Water at Hamble in a Saro "Cloud" amphibian.

Holmes and Salisbury-Hughes. Mr. Bill Thorn delivered a D.H. "Dragon" to the Amsterdam Flying Club. Mrs. Battye's machine has arrived at the repair shops for renewal of C. of A. Brooklands Airways have been busy lately doing taxi work, chiefly to the Continent.

BRISTOL AND WESSEX AEROPLANE CLUB

The first six months of the financial year of the Bristol and Wessex Aeroplane Club, which began on April 1, shows an increase of over 250 hr. flying when compared with the same period of last year. Mr. S. H. Binning qualified for an "A" licence during the week and Messrs. W. L. Stranger and R. J. Lee did first solos. Mr. Binning celebrated his first solo by buying a "Gipsy II Moth" from Norman Edgar & Co. The Bristol Club are holding their first dance of the season at the Grand Spa Hotel, Clifton, on Friday, October 27.

MAIDSTONE AERO CLUB

The Maidstone Flying School's "Bluebird" has been very busy doing cross-country flights and the "Moth" giving dual. The Club's first monthly "At Home" is being held on Sunday, November 5, and on Friday, October 27, a special dance is being held.

READING AERO CLUB

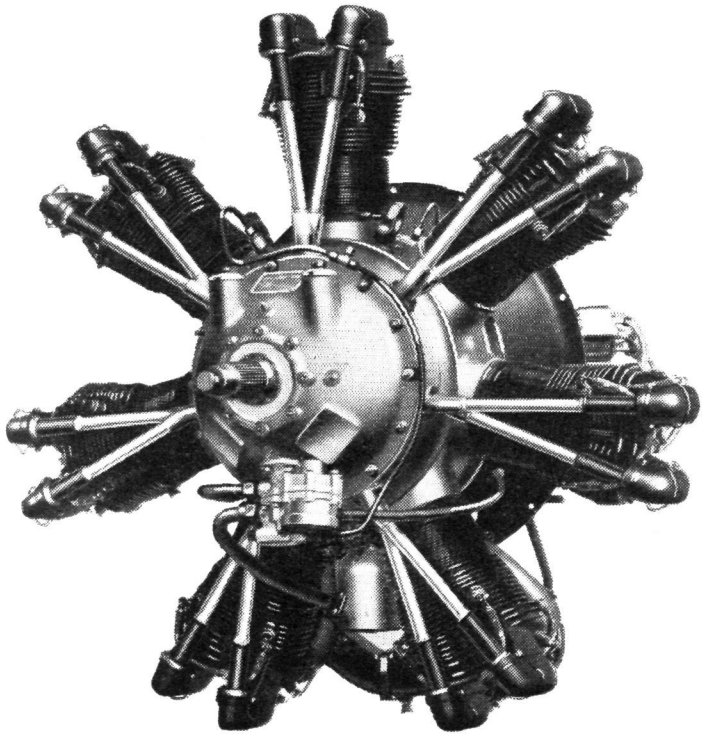
Arrangements are now complete for the luncheon for women pilots and other females interested in aviation. As already announced, there will be a punctuality prize for the lady landing nearest 12.45 hr., of £5. Ladies are reminded that even if it rains, lunch will be served in the club-house. Among latest owners of the Miles "Hawk" are Mrs. Macdonald, Sir Alfred Beit, Bt., M.P. for St. Pancras, and Mr. E. D. A. Bigg, who is shortly returning to Nairobi. The dance on Saturday, October 7, was a great success; the next one will be held on Saturday, November 18. Mrs. Macdonald is staying at the Club and is having advanced dual on her "Hawk," Mr. Shamah is taking the blind-flying course, and Mr. Ruddle the full "B" licence course. Flying times for the week totalled 60 hr.

THE SOUTHEND FLYING CLUB

Very satisfactory flying hours have been maintained at the Rochford Aerodrome; in fact, so great has been the demand during week-ends that another machine may be provided at special rates for "A" licence pilots. Mr. Deavin made a very creditable first solo, several others are approaching solo stage, and two new pupils have started instruction. In addition to the regular taxi work to Croydon and Heston, cross-country flights have been made to Manston and Margate by Mr. Brown, and to Ford, Sussex, by Mr. Sylvester. Visitors included Mr. Mark Young and passenger in the Stage and Screen



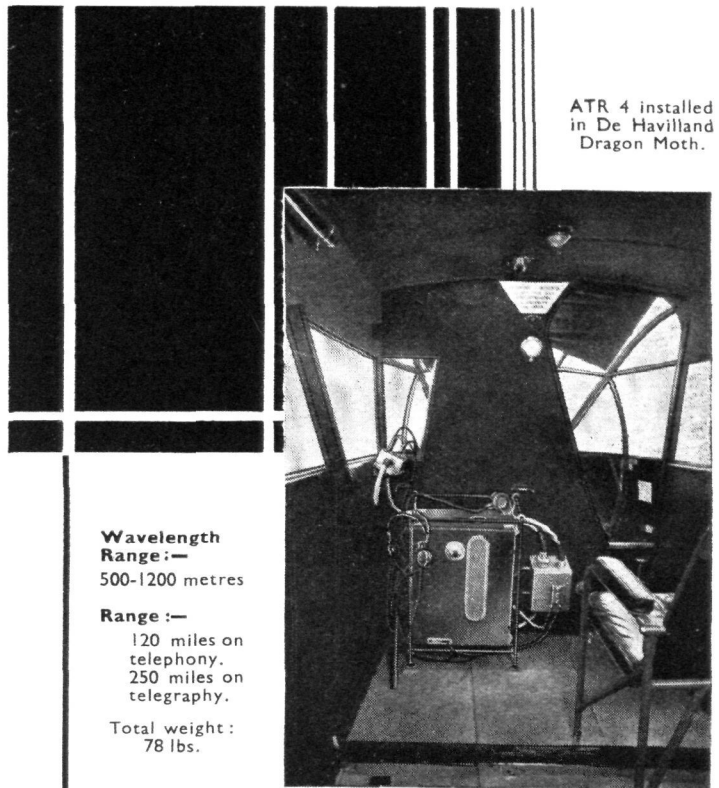
AFTER THE WEDDING: Lord and Lady Furness leaving Stag Lane for a flight in their D.H. "Dragon" (two "Gipsy Majors"), piloted by Mr. T. Campbell Black.



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FOR TRAINING : A row of Blackburn B2 Trainers used at the Blackburn School at Brough for training R.A.F. Reserve pilots. The machines are fitted variously with "Hermes" and "Gipsy" engines. (FLIGHT Photo.)

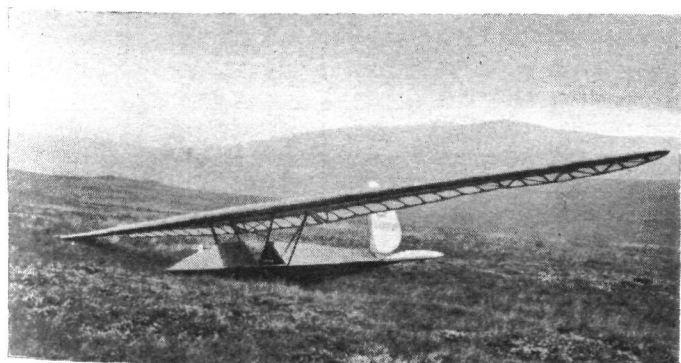
Flying Club's "Gipsy Moth" from Hatfield and Mr. Scholes in his "Puss Moth" from Heston. Considerable interest was caused lately by an R.A.F. Fairey III.F which used the aerodrome during co-operation with the Army.

NORTHAMPTONSHIRE AERO CLUB

Flying times for the week amounted to 15 hr. 35 min., in spite of the fact that three days were ruined by gales. Mr. D. Smith has almost completed tests for an "A" licence and two new members have been enrolled. Visitors during the week included Mr. and Mrs. Dupe, of Lympne Airport, Capt. Hust of Heston, Mrs. Battye of Reading, and Mr. Evans of Birmingham. The new aerodrome is now ready for use for instructional purposes.

NORFOLK AND NORWICH AERO CLUB

Mr. J. Collier gave instruction to Messrs. J. C. Smith, G. R. F. Clerk, F. W. Rushmer, and P. M. Britton. Solo flights were done by Miss W. F. Hudd, Messrs. A. Kirkby, E. V. Goodhill, S. Hansel, P. M. Britton, H. C. Stringer, and W. O'Brien. Mr. P. M. Britton is to be congratulated on passing his tests for a pilot's licence. For the benefit of Club members who desire to send out Christmas cards, a number of cards are being prepared with the Club crest dye-stamped in gold, and a mounted aerial photograph inside; these may be obtained from the Club Secretary. Over 120 tickets have been sold for the Annual Ball which is being held at the Thatched Assembly Rooms on Friday, November 3. Fred Anderson's Band has been engaged.



EFFICIENT DESIGN : The "Scud II" sailplane designed by Mr. L. E. Baynes and built by E. D. Abbott & Co., Ltd., of Farnham, won all the first prizes at the B.G.A. meeting at Thirsk on October 7 and 8, one of the best performances being the 15-mile flight of Mr. P. Wills, which won the Lord Wakefield Trophy for distance.

Delivery of the "Leopard Moth"

With reference to a paragraph which appeared in FLIGHT for September 14, stating that orders for the "Leopard Moth" given now could not probably be met owing to the number of orders already received, Brian

CARDIFF AEROPLANE CLUB

Owing to the bad weather, flying has been severely handicapped during the past week, only 4 hr. 35 min. dual, 3 hr. 40 min. solo and 40 min. tests being done.

LONDON GLIDING CLUB

October 15 was very typical of an average Sunday at the London Gliding Club's ground at Dunstable, where increasing activity is to be seen. Of the Club machines, the "Prüfling," "Hol's der Teufel," "Crested Wren," Kassel two-seater, and "Tern" soared repeatedly, the "Wren" circling up to 850 ft. with the help of an extra rising current. Flying was continuous throughout the day from 11 a.m. until dark, and as usual was finished without any damage being recorded. A "C" certificate was obtained with a flight of half an hour. Many beginners were also present, and several were given periods of up to half-an-hour's dual instruction in the Kassel. The general standard of piloting continues to improve week after week, and it can truthfully be said that it is fully up to that of any other gliding club in the world.

BOMBAY FLYING CLUB

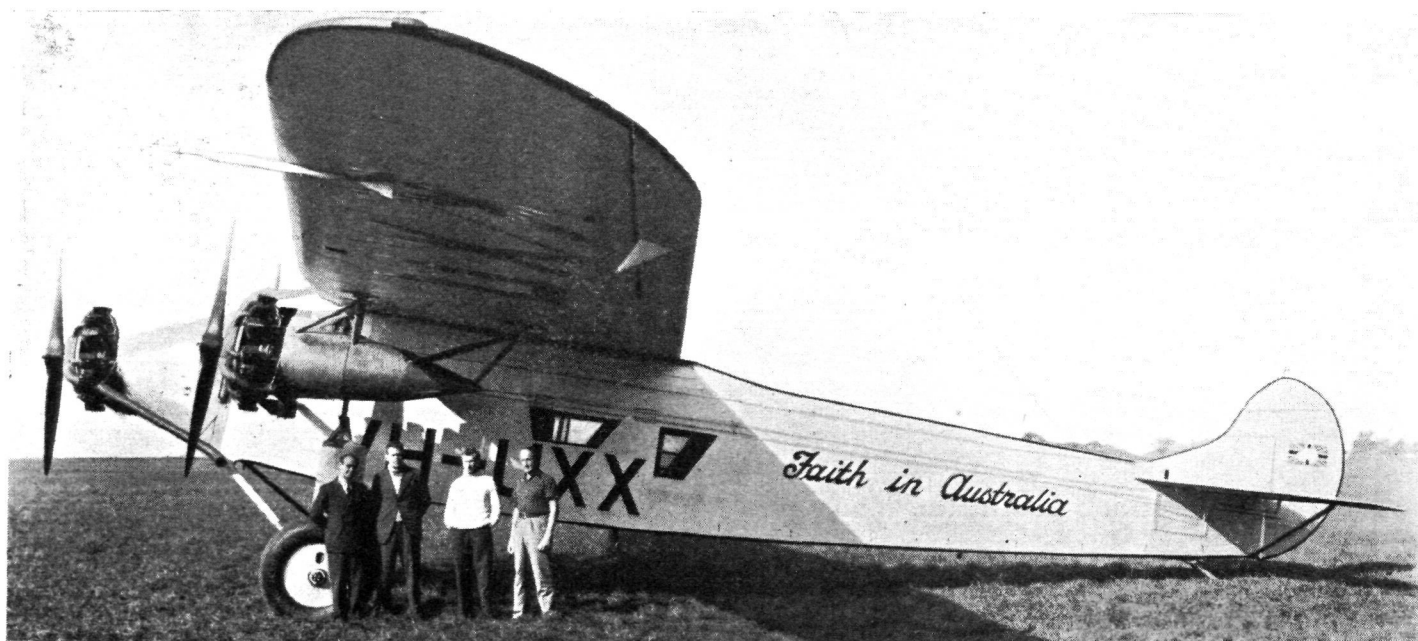
The Bombay Flying Club showed a monthly flying return of 4 hr. 55 min. dual and 44 hr. 20 min. solo for July. The Club have in commission five machines, four "Gipsy Moths," two of which are metal, and one "Fox Moth." Owing to the bad weather, and the illness of Maj. Vetch, the chief instructor, the machines were sent off on a joyriding tour in the South. After a fortnight, however, they returned to Poona to start instructional work and joyriding at the Yeravda landing ground. New members of the Club are Mrs. H. Hulme, Messrs. M. V. Sathe, E. Donald, N. F. Heoroji, C. P. Mitchell, R. A. Dubash, C. R. Renfree, R. P. Umrigar, J. H. Vakeel, N. F. Dalal and Roger Falk.

BENGAL FLYING CLUB

The Club remained open during the whole of the month of August, although for a week the aerodrome was in an extremely wet condition. Five pupils started instruction, Messrs. G. W. R. Fitzau, W. C. Bartley, W. G. Robinson, H. S. Hvistendahl, and S. B. Ghose. "A" licences were obtained by Messrs. B. N. Bhattacharjee, F. W. Moncreiff, and Capt. M. C. R. Harris, the latter two are members of the Reserve of Air Force Officers, and have held licences before. One of the Club's "Moths" has been sold to a syndicate composed of Dr. A. M. Leake, Capt. W. Johnson-Cole, and Messrs. J. W. Ross and B. N. Bhattacharjee. Cross-country flights have been made to Contai and return by Messrs. W. Dougall and W. Molyan, the latter in his own Westland "Widgeon." The President of the Club, the Hon. Mr. Justice Costello, departed to England by air in one of the K.L.M. machines. Indian Trans-Continental Airways, Ltd., have given several flights to members of the Press and city officials of Calcutta. The total membership of the Club is 346. During August 42 hr. 15 min. and 103 hr. 5 min. solo flying was done with four machines in commission.

Lewis, the distributors for this aircraft, have written to point out that they have three "Leopard Moths" for delivery during December. When these have been disposed of, there will be no more available until January, as stated in FLIGHT.

AIRISMS FROM THE FOUR WINDS



ANOTHER ENGLAND-AUSTRALIA FLIGHT: C. T. P. Ulm (second from left) and his companions, Allan, Edwards and Taylor, and the Avro X in which they are flying to Australia—hoping to better Kingsford-Smith's time.

Mr. Ulm's Progress

MR. CHARLES ULM, having been prevented by bad luck from bringing to a successful conclusion his round the world flight, has decided to have a go at the Australian record, and is, in fact, already well on his way. He is flying an Avro X, with three Wright "Whirlwind" engines, and has with him Messrs. J. Allan, P. V. Taylor, and John Edwards. Mr. Ulm left Feltham aerodrome at 10.30 p.m. on Thursday, October 12, and arrived at Athens in the afternoon of Friday, October 13, having flown 1,570 miles in 14 hr. 50 min., an average speed of about 112 m.p.h. He left Athens again at 10 p.m. (local time) and arrived at Baghdad at noon on Saturday, October 14. Flying non-stop he arrived at Karachi on Sunday afternoon, October 15, and left two hours later for Calcutta. He reached Calcutta at 11.30 on Monday, October 16, after having been forced to land at Gaya. Twenty minutes later Mr. Ulm was ready to proceed and had his machine wheeled out in pouring rain, but the centre engine failed and a delay resulted.

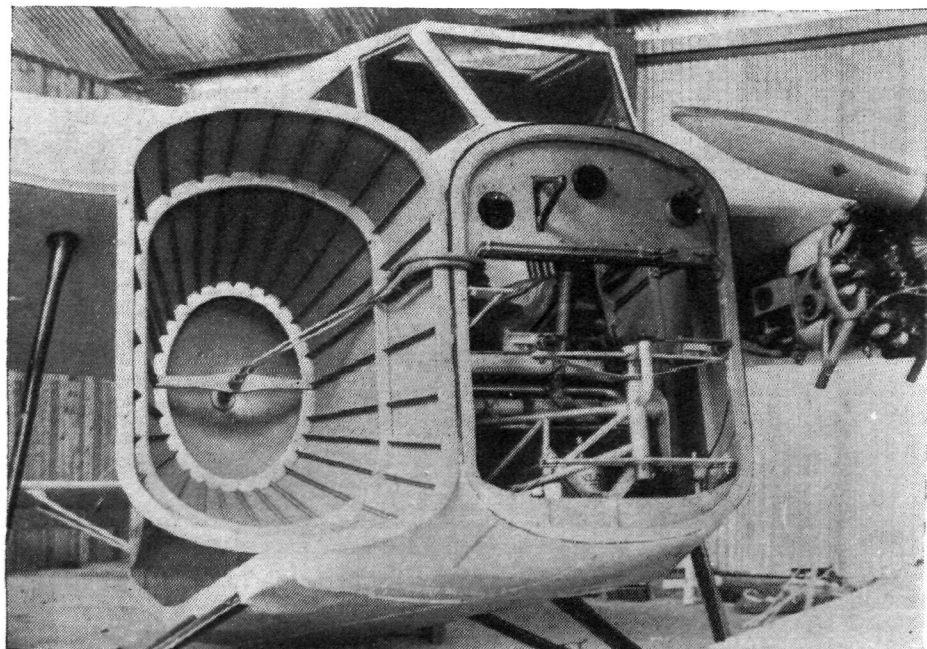
Capt. Crawford Greene's Flight

CAPT. W. P. CRAWFORD GREENE, who, as was reported in FLIGHT for last week, is flying to Australia in a "Spartan" Cruiser, has as a passenger Lord Apsley, M.P., the son of Earl Bathurst. They arrived at Athens on Thursday, October 12, having been detained at Brindisi by mistake.

Service Flight to Gambia

THREE Vickers Victoria machines of No. 218 (Bomber Transport) Squadron left Heliopolis on Saturday, October 14, for a flight to Bathurst, Gambia, and return. The route will be by way of Nigeria, the Gold Coast, and Sierra Leone, a distance of about 11,700 miles.

ACCESSIBILITY: The nose of the new Short monoplane (two Pobjoy engines) is hinged so as to allow ready inspection and adjustment of the controls, instruments, etc. The machine is at present being thoroughly tested by Mr. Lankester Parker before deciding on production. That the machine is efficient is shown by the fact that, carrying three occupants for each Pobjoy engine, the top speed is in the neighbourhood of 115 m.p.h. (FLIGHT Photo.)



Polish Machines Visit Rumania

A FLIGHT of 32 Polish aeroplanes, under the command of Col. Rayski, left Lemberg on Monday, October 16, for a visit to Bucarest, to return the official visit recently made by Rumania.

The "Aeolus" Engine

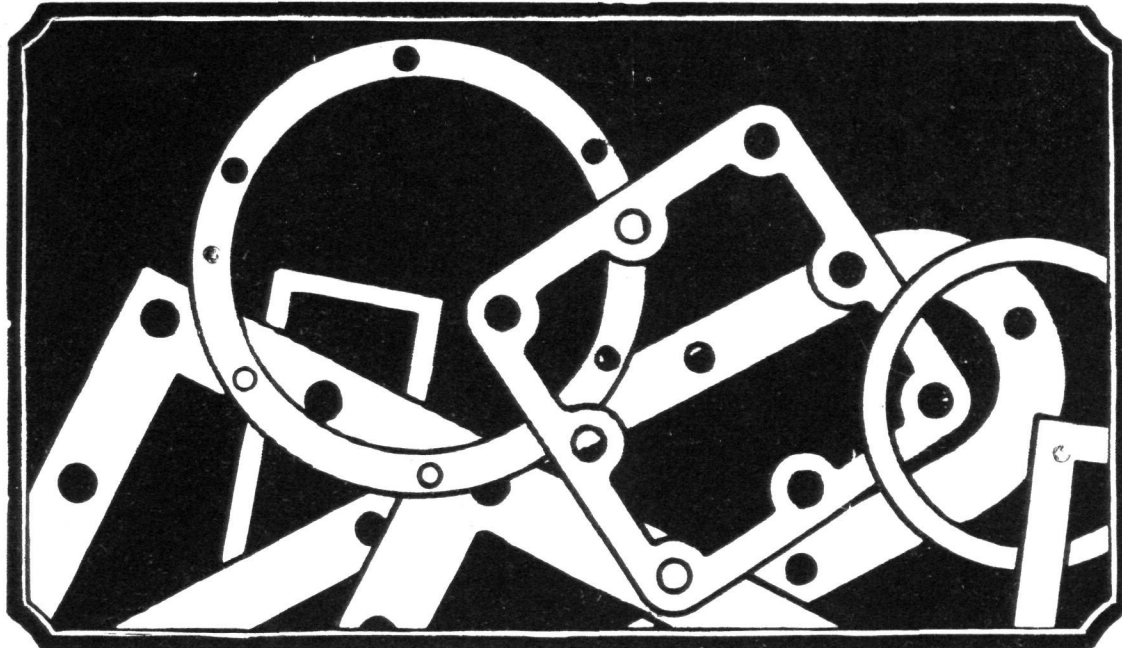
THE "Aeolus" engine, which was described in FLIGHT for October 5, 1933, has, we are told, been put through some preliminary tests, and has performed very satisfactorily. Further tests are being carried out at Gillett Stephen's works at Great Bookham prior to a full type test. The Low Engineering Co., Ltd., have also under the Devaney patents started work on an air-cooled aircraft engine of considerably greater horse-power than the "Aeolus."

R.A.F. Officer Crashes in Anatolia

F/O. T. P. GLEAVE, of No. 1 (Fighter) Squadron, is reported to have left Lympne on Wednesday, October 11, to fly to Colombo, Ceylon. News comes from Constantinople that he has crashed near Kutahia, in Anatolia; his machine is badly damaged, but he himself is not injured.

Civil Machines in Australia

THE following statistics of machines holding C. of A.'s in Australia should prove of interest. Of a total of 197



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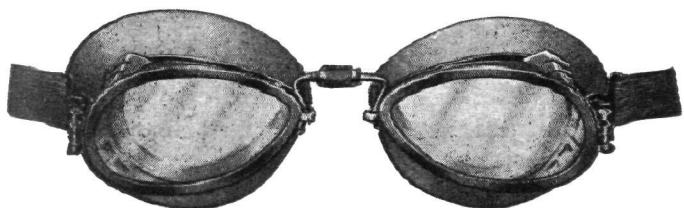
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machines, 182 are of British or Australian construction, and of the remainder 7 are of American construction, 7 of German and 1 of Dutch. There is one civil aeroplane to every 32,000 persons, and the different types number 45. The British machines comprise Avro-504K, Avian (14), X (4); Beardmore Wee Bee; Blackburn Bluebird (2); Bristol Monoplane; Desoutter (3); de Havilland, 4, 9 (3), 50 (3), 50A (14), 60 (9), 60X (15), 60G (45), 60M (28), 61 (5), 66 (2), 75 (2), 80 (6), 83 (5); Percival Gull; Saro 17B; Simmonds Spartan (2); Spartan Arrow; Sopwith-Dove, Gnu; Vickers Vicia (2); Westland Widgeon (2), and Windover Amphibian. Australian machines comprise Genairco (4); Lascoter; Lasconder. The foreign machines are made up of: American Alexander Eaglerock; American Eagle; Curtiss Robin; Fokker Universal; Ryan Monoplane, and Waco 10. German, Junker, F.13L, G.34, G.31 (3), W.33/34; Klemm, V.L.25. Dutch, Fokker, F.7 (2).

Lord Wakefield's Offer

At a banquet held at Hull on Wednesday, October 11, in connection with the Hull Civic Week, a telegram was received from Lord Wakefield offering £15,000 towards the establishment of a Chair of Aeronautical Engineering.

The Three-Seater Klemm with "Gipsy III" Engine

FURTHER details of the performance of the new "Gipsy III" engined three-seater Klemm have now come to hand. In FLIGHT for October 5 we illustrated a machine of this type which Mr. A. B. Gibbons has recently bought from Herr Fretz, who had it built for the Rundflug two years ago. As will be seen, the wing surface has been decreased considerably when compared with that of the standard Klemm, but the landing speed has been, despite this, kept down to a low figure by the use of trailing edge wing flaps. The front two seats are slightly staggered side by side, without dual control, and the third seat is behind them. Differential wheel brakes are fitted worked by a hand lever and the rudder bar. The wing folding arrangement is such that the wings can be folded by one man. The wing is released by withdrawal of the main hinge pins, rotated, leading edge downwards, and then folded on an auxiliary hinge.

Span (approx.) 36 ft. 8 in. (11.17 m.).

Wing area (approx.), 160 sq. ft. (14.86 sq. m.).

Cruising speed, 128 m.p.h. (206 km./hr.).

Top speed, 142 m.p.h. (228.5 km./hr.).

Landing speed (with flaps), 32 m.p.h. (51.5 km./hr.).

Take-off run (full load), 90 yd. (82.3 m.).

Weight, empty, 1 058 lb. (480 kg.).

Weight, fully loaded, 1 896 lb. (860 kg.).

Range, 600 miles (965.6 km.).

First Swedish Aircraft Carrier Launched

THE *Gotland*, the first aircraft-carrying cruiser of the Swedish Navy, has just been launched at the Lindholmen shipyards in Gothenburg. The *Gotland* has a displacement

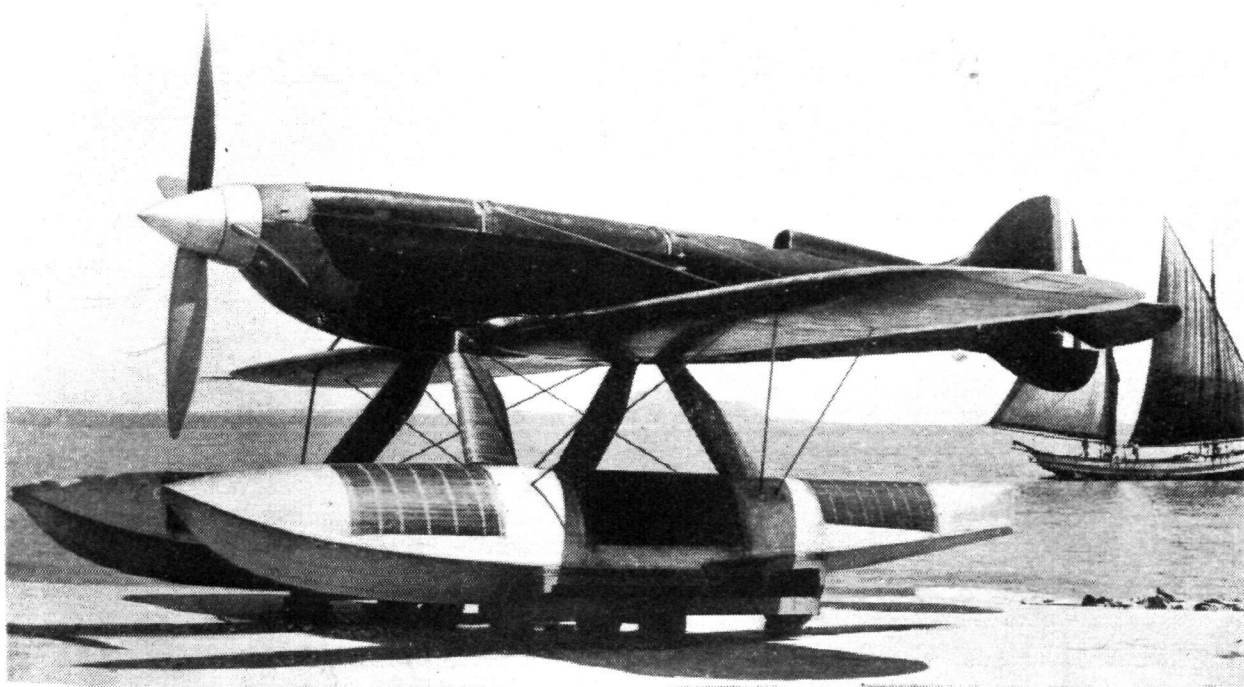
of 4,600 standard tons, a length of about 400 ft. and space for eight seaplanes with a catapult arrangement. It is equipped with six 15-cm. guns, four 75-mm. anti-aircraft guns, four 25-mm. machine guns and two triple torpedo tubes. It is propelled by two de Laval turbines, each of 33,000 h.p., and has a speed of 27-28 knots. It carries a complement of 467 men, and its technical installations include a number of interesting innovations.

British Engines in New Guinea

NEWS comes from New Guinea that engines of British make have been doing sterling work in conditions which are far from favourable, the temperature being exceptionally high, and the humidity of the air quite extraordinary, also machines have to be taken off with full load from high aerodromes. The Bristol engines fitted in a Fokker VII have been giving remarkable service, and the Pacific Aerial Transport, Ltd., reports that one engine, on being removed for overhaul after 520 hr. running, was found to be in such a good condition that it could easily have done another 150 hr. During the whole of the 520 hr. four cylinders were removed for grinding and internal inspection, and the oil, which was changed only twice, seemed in good condition each time.

Help Yourself for Half-a-Crown

WHEN hospitals and charities have benefited to the extent of over £402,000 there must be something very attractive in the bait which provides such a harvest—irrespective of the satisfaction which accrues from giving support to so good a cause. The foregoing refers to the record to date of the "Help Yourself" Society's contribution in aid of their Christmas Charity Fund, inaugurated by the Stock Exchange Dramatic and Operatic Society. All can help forward this splendid effort for the modest sum of 2s. 6d., the price of the delightful "Help Yourself" Annual which has just been again issued for 1933. There are stories and illustrations by John Buchan, "Sapper," and Denis Mackail, to mention only some of the numerous well-known contributors. An art gravure section, pages in colours and a wireless constructional article help to make this a very attractive publication. But perhaps the most interesting part of the Annual is the list of over 2,000 gifts, including £1,000 worth of goods at Harrods, which are valued at over £20,000. These gifts are available for free distribution among members of the "Help Yourself" Society. Membership is obtained by buying a copy of the Annual, for the purchase of which a numbered receipt is given. Quite apart from the list of gifts, every member who sells 20 or more copies of the Annual receives absolutely free a Christmas box valued at well over 5s., and for whom there is, in addition, a special list of gifts. Send 2s. 10d. for a post free copy of the Annual, to include membership, to F. Preston, "Help Yourself" Society, 3, Copthall Buildings, E.C.2, and, as we have said, help yourselves and the hospitals—but before November 24.



391 M.P.H. : The Macchi seaplane (Fiat engine) on which the Italian pilot Cassinelli established a new world's speed record over a 100-km. closed circuit by averaging 629.37 km. per hr. (391 m.p.h.).

THE HANWORTH WORKSHOPS

REPAIR and overhaul work of the highest quality continues to be turned out of the workshops of National Flying Services at Hanworth Park. There seems to be great scope for a repair shop of this kind, and Capt. E. D. Ayre, who is in charge, has found that aircraft owners who go away satisfied always come back to him with their next job. From the beginning of the year up to November 9 he had had 450 jobs for owners, of which 134 were complete aircraft jobs, that is, either complete rebuilds or overhauls for C. of A., and 61 complete engine jobs. Besides these there were 137 jobs for N.F.S., of which 37 were complete aircraft and 38 complete engine jobs. This record speaks for itself of the confidence which aircraft users must have in the work done there. At the present time they have one of Lord Clydesdale's "Clouds" in

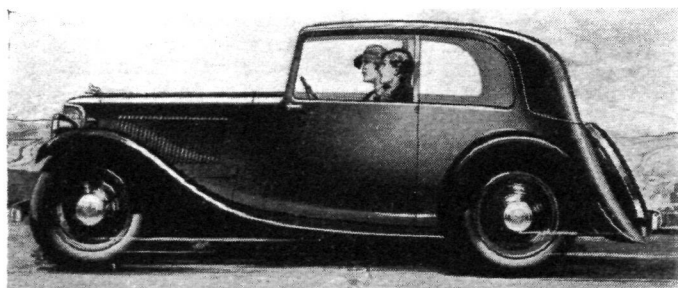
for overhaul, and they have just completely overhauled a spare Wright "Whirlwind" engine for the same owner. It will be remembered that Capt. Ayre did very well indeed in the last King's Cup Race with a Desoutter which he had had "hotted up" in N.F.S. shops. Now he has redesigned the cowling and windows of another of the firm's Desoutters, with excellent results, as our photographs show. Slotted ailerons are at one and the same time a safeguard and an efficient means of making ailerons do their work. There is a growing tendency among designers to use this Handley Page patent, which is standardised on the Imperial Airways aeroplanes of the "Hannibal" and "Heracles" class. The newest Klemm will also have them, and up to date 24 types are thus fitted.



A view (left) of the Hanworth cowling on one of the N.F.S. Desoutters ("Gipsy II"). This new clean design was made by the N.F.S. repair shops at Hanworth Park. On the right is shown another alteration to the N.F.S. Desoutter—the fitting of sliding windows to the passengers' cabin. These can be kept open in flight without undue draught entering the cabin.



A NEW ARMSTRONG SIDDELEY CAR



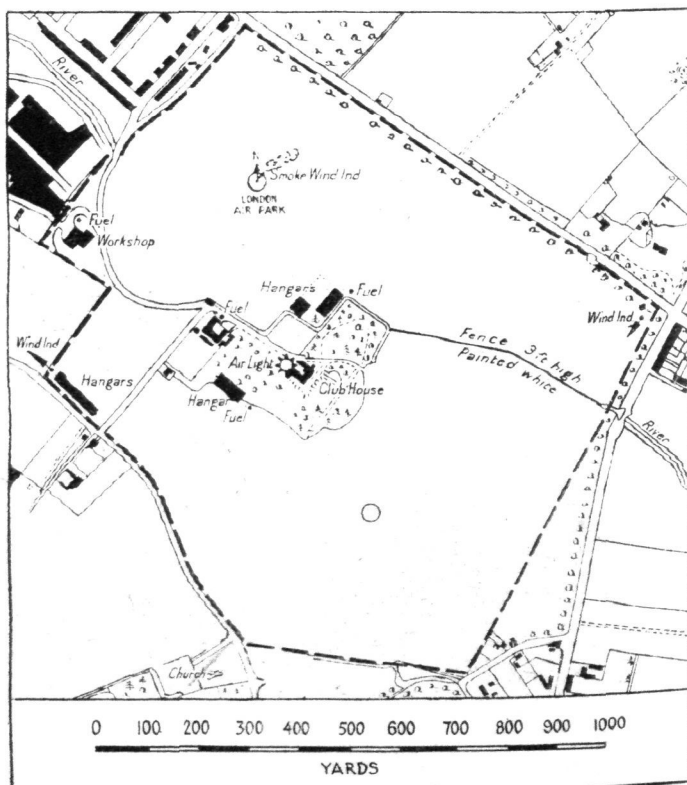
ARMSTRONG SIDDELEY cars, with their delightful pre-selector gear, are well known in aviation circles, as many of the prominent designers and aircraft manufacturers use them.

For the most part they are naturally more interested in the larger models, as the higher horse-power gives a performance more in keeping with the long journeys which they have to undertake and the comfort which is necessary for the maintenance of bodily efficiency at the end of such journeys. Their sons and daughters, however, prefer the more "sporting" type of performance of the small cars, and these will be glad to learn that this firm has now produced, as a surprise for the Motor Show at Olympia, a new Sports Coupé on the 12-h.p. chassis. This model, being lighter and more compact, will give them the lively performance which they like. An enclosed luggage container is built into the sweeping back, and the specification includes modern items like permanent jacks, sliding roof, and an engine and chassis so designed that both will give full performance over long periods without other than the veriest routine attention.

This new model is the most dignified sports model we have seen, and it was definitely one of the sensations of the Show, when it opened on Thursday, October 12, combining, as it does, the "speedy" look so much sought after nowadays with the solid reliable atmosphere for which Siddeley cars are now renowned.

National Flying Services Affairs

NATIONAL FLYING SERVICES, which company has been in the hands of the receiver, Mr. C. J. G. Palmour, for some time, has had the period of receivership extended until January 8, 1934. Pilots visiting Hanworth Park are warned that a fence has been erected across the E. portion of the landing area, as indicated on the plan below. The fence is approximately 3 ft. in height and is painted white.



THE ROYAL AIR FORCE

London Gazette, October 10, 1933

General Duties Branch

F/O. C. M. Champion de Crespigny is granted a permanent commn. in this rank (Sept. 1). Lt. L. I. T. Whitaker, Rifle Brigade, is granted a temp. commn. as Flying Officer on secondment to the R.A.F. (Sept. 25). Pilot Officer W. M. Keddie is promoted to rank of Flying Officer (Sept. 11). Flt. Lt. J. H. Edwards Jones is placed on half-pay list, Scale B, from Oct. 3 to Nov. 15, inclusive. P/O. G. C. Tomlinson takes rank and precedence as if his appointment as Pilot Officer bore date Aug. 14. Reduction takes effect from Aug. 14. (Substituted for *Gazette*, Oct. 3.) Flt. Lt. J. F. Clark is placed on retired list (Oct. 5). Flt. Lt. H. F. Bradley is placed on retired list (Oct. 10). Flt. Lt. H. E. E. Weblin resigns his short-service commission (Oct. 4). The short-service commn. of Acting Pilot Officer on probation W. G. E. Elborough is terminated on cessation of duty (Oct. 6).

Accountant Branch

Flt. Lt. H. A. Murton is placed on half-pay list, Scale A, from Oct. 7 to 9, inclusive.

Medical Branch

Flt. Lt. G. A. M. Knight, M.B., B.S., is granted a permanent commn. in this rank (Oct. 11). F/O. C. H. Smith, M.D., C.M., is promoted to the rank of Flight Lieutenant (Oct. 2).

Memorandum

318080 Flt. Cadet Joseph Connell is granted an hon. commn. as Sec. Lt. with effect from date of demobilisation.

Erratum

In *Gazette* Sept. 26 (FLIGHT, Oct. 5, 1933, p. 1013) for N. K. Campbell read N. K. Cambell.

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The follg. Pilot Officers on probation are confirmed in rank:—C. P. Aron (Sept. 1); G. N. Beckmann, J. H. Hoggart-Hill (Sept. 8); R. L. Bowes (Sept. 15). F/O. B. P. Jones is transferred from Class C to Class A (Sept. 9).

Medical Branch

Flt. Lt. C. Y. Roberts relinquishes his commn. on completion of service and is permitted to retain his rank (Sept. 21).

SPECIAL RESERVE*General Duties Branch*

P/O. T. R. Leatherdale is promoted to rank of Flying Officer (Jan. 25). F/O. G. D. S. Horsfall resigns his commn. (Jan. 30, 1930). (Substituted for *Gazette* July 26, 1932.)

AUXILIARY AIR FORCE*General Duties Branch*

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—G. A. B. Cooper is granted a commn. as Pilot Officer (Sept. 20).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain I. G. V. Fowler, A.F.C., to R.A.F. Depot, Middle, East Aboukir, 18.9.33, to command, vice Group Capt. J. T. Cull, D.S.O.

Wing Commanders: C. H. Keith, to Air Ministry, Dept. of A.M.S.R. (D.S.R.), 2.10.33, on appointment as Assistant Director (Armament), vice Wing Com. A. A. B. Thomson, M.C., A.F.C. H. W. G. J. Penderel, M.C., A.F.C., to H.Q., Fighting Area, Uxbridge, 5.10.33, for Personnel Staff duties.

Squadron Leaders: G. G. Dawson, to No. 207 (B.) Sqdn., Bircham Newton, 29.9.33, to command, vice Wing Com. J. L. Vachell, M.C. J. C. Brooke, D.S.C., to Station H.Q., Worthy Down, 29.9.33, for engineer duties, vice Sqd. Ldr. E. Thornton. S. P. Simpson, M.C., to Administrative Wing, Cranwell, 4.10.33, for administrative duties, vice Sqd. Ldr. P. G. Scott. F. M. F. West, V.C., M.C., to No. 4 (A.C.) Sqdn., S. Farnborough, 4.10.33, to command, vice Sqd. Ldr. S. P. Simpson, M.C.

Flight Lieutenants: C. McK. Grierson, to No. 210 (F.B.) Sqdn., Pembroke Dock, 30.9.33. G. W. Hayes, to No. 18 (B.) Sqdn., Upper Heyford, 1.10.33. H. J. G. E. Proud, to Station H.Q., Bircham Newton, 30.9.33. N. S. Allinson, to Air Ministry, Dept. of A.M.P. (D. of T.), 2.10.33. F. S. Hodder, to R.A.F. Base, Calshot, 2.10.33. P. E. Berryman, to No. 26 (A.C.) Sqdn., Catterick, 5.10.33. G. V. T. Thomson, to R.A.F. Training Base, Leuchars, 1.10.33. J. H. C. Wake, to Experimental Section, Royal Aircraft Estab., S. Farnborough, 18.8.33. E. T. Carpenter, A.F.C., to Station H.Q., Northolt, 2.10.33. E. J. H. F. Moreton, to No. 17 (F.) Sqdn., Upavon, 6.10.33. F. L. Pearce, to No. 100 (B.) Sqdn., Donibristle, 5.10.33. B. H. Ashton, to No. 7 (B.) Sqdn., Worthy Down, 27.9.33. G. D. Daly, D.F.C., to No. 54 (F.) Sqdn., Hornchurch, 8.10.33. J. T. Paine, to Reception Depot, West Drayton, 7.10.33. A. H. Wheeler, to No. 41 (F.) Sqdn., Northolt, 30.9.33.

Flying Officers: H. M. Gahan, to No. 24 (Commn.) Sqdn., Hendon, 2.10.33. L. I. T. Whitaker, to R.A.F. Training Base, Leuchars, 25.9.33, on appointment to a temp. commn. A. C. Weldon, to R.A.F. Training Base, Leuchars 18.9.33, on appointment to a temp. commn. R. J. Cooper, to No. 3 Flying Training School, Grantham, 9.10.33. W. H. Hutton, to No. 210 (F.B.) Sqdn., Pembroke Dock, 9.10.33. W. C. Pitts, to No. 40 (B.) Sqdn., Abingdon, 9.10.33. G. R. Stroud, to R.A.F. Depot, Uxbridge, 9.10.33.

Pilot Officers: G. C. Tomlinson, to No. 111 (F.) Sqdn., Hornchurch, 25.9.33. The undermentioned Pilot Officers are posted to No. 5 Flying Training School, Sealand, on 16.9.33, on appointment to Permanent commns.:—R. T. Gething, D. G. Lewis, J. K. Rotherham, K. C. Willett.

Stores Branch

Flight Lieutenant A. Walters, to Station H.Q., Abingdon, 26.9.33.

Accountant Branch

Squadron Leader I. L. Wincer, to R.A.F. Training Base, Leuchars, 3.10.33, for accountant duties, vice Sqd. Ldr. J. S. Griffiths.

Flying Officers: E. A. Biddle, to H.Q., Inland Area, Stanmore 4.10.33. C. A. Proffitt, to No. 33 (B.) Sqdn., Bicester, 1.10.33.

Medical Branch

Wing Commanders: R. S. Overton, to No. 1 Air Defence Group H.Q., 2.10.33, for duty as Principal Med. Officer, vice Wing Com. R. W. Ryan. R. J. Aherne, M.C., to H.Q., Central Area, 3.10.33, for duty as Principal Med. Officer.

Squadron Leader T. McClurkin, to Special Duty List, 2.10.33, for duty at Chemical Defence Experimental Station, Porton.

Flight Lieutenants: B. W. Cross, to Princess Mary's R.A.F. Hospital, Halton, 28.9.33. J. Kemp, to R.A.F. Pathological Laboratory, Halton, 2.10.33. J. D'I. Rear, to Princess Mary's R.A.F. Hospital, Halton, 28.9.33. A. M. Weston, to R.A.F. Hospital, Aden, 5.9.33. (Hon. Sqd. Ldr.) C. A. E. I. Brownlee, to School of Naval Co-operation, Lee-on-the-Solent, 25.9.33.

Flying Officers: W. Hall, to Princess Mary's R.A.F. Hospital, Halton, 29.9.33. H. J. Melville, to No. 8 (B.) Sqdn., Aden, 5.9.33. J. F. Sandow, to Air Armament School, Eastchurch, 10.10.33.

Chaplain's Branch

Rev. W. T. Rees, B.D., to No. 5 Flying Training School, Sealand, 6.10.33, for duty as Chaplain (C. of E.), vice Rev. R. N. Shapley, M.C. Rev. R. N. Shapley, M.C., to Station H.Q., Boscombe Down, 9.10.33, for duty as Chaplain (C. of E.) at Boscombe Down and Netheravon, vice Rev. J. I. Stuttaford.

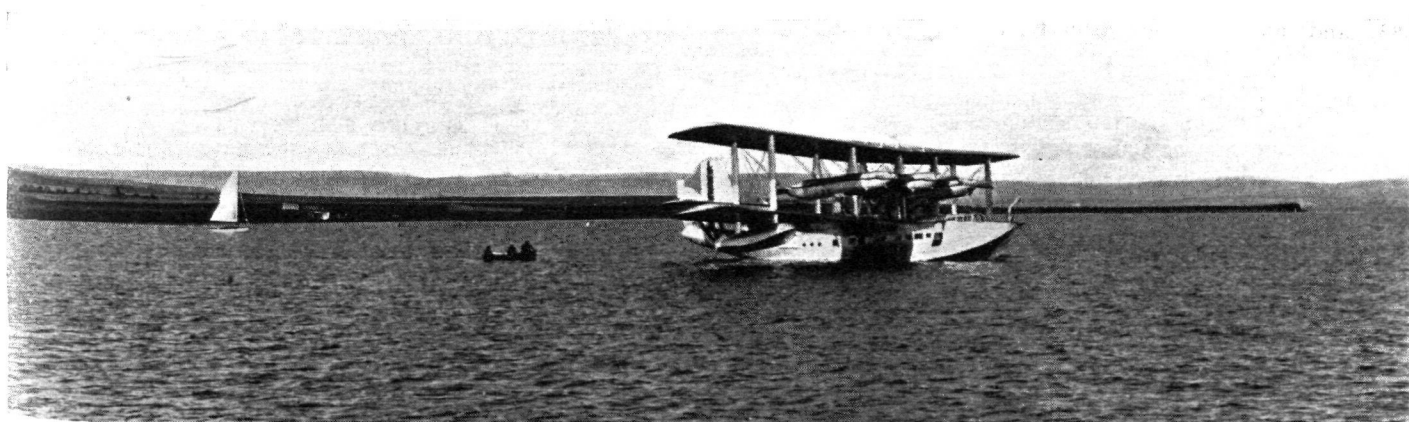
NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—

Lieut.-Commanders.—A. E. Dodington, to *Victory* for R.A.F. Base, Gosport (Oct. 17); H. P. Brister, to President for Air Ministry, for four weeks' course at Meteorological Office and to *Courageous* (Nov. 18).

PROMOTION

Sub-Lieutenant W. J. Lucas (Flying Officer, R.A.F.), to rank of Lieutenant (seny. Oct. 1).



A SHORT VISIT TO SCOTLAND: The Short six-engine flying-boat which paid a visit to Kirkwall Bay on September 21.

ENGLAND-AUSTRALIA IN SEVEN DAYS

(Concluded from page 1042)

later models have had the "Gipsy Major" and the Napier "Javelin." For his flight to Australia, Sir Charles Kingsford-Smith used the de Havilland "Gipsy Major" four-cylinder inverted engine of 130 b.h.p.

In order to increase the range and permit of very long "hops" being made, an extra petrol tank was installed in the cabin of the "Gull," in the space normally occupied by the two passengers. This tank brought the total petrol capacity up to 120 gallons, which was estimated to give the "Gull" a still-air range of slightly more than 2,000 miles.

It is worth placing on record the identity of some of the materials and equipment which were used on the flight, as they have played a very important part in the success of the flight, and have thereby contributed their share to the prestige of British aviation material. The "Gull" was doped with Cellon, the particular scheme used being the new "CV" specially introduced for civil aircraft. The machine was equipped with a full range of Smith's instruments, and with Husun turn and bank indicator and aperiodic compass. The plugs were K.L.G., and on his arrival Sir Charles sent the following cable to the suppliers: "Instruments, compass, plugs absolutely perfect. Wish self was as reliable. Regards. Kingsford-Smith."

The "Gull" was fitted with Palmer wheels and brakes, and a Fairey metal propeller was used. In the "Gipsy Major" engine, Hoffmann ball bearings were fitted, ignition was provided by B.T.H. magnetos, while the carburation was effected by a Claudel Hobson carburetter. Adequate and correct lubrication was ensured by the new Mobiloil, and the navigation lights were fed by Exide batteries.

* * * *

BRIEFLY

M.G.'s, those amazingly successful little sports cars, to which we have had the pleasure of referring from time to time, continue to pile up victories in races all over the world. Their latest is a series of international, Class G, records (subject to confirmation). At Monthery, Mr. G. E. T. Eyston, driving an M.G. "Magna," did the 12 hr. at 81.23 m.p.h., the 1,000 miles at 81.25 m.p.h., the 2,000 km. at 80.75 m.p.h., the 3,000 km. at 80.75 m.p.h., the 2,000 miles at 80.49 m.p.h. and the 24 hr. at 80.56 m.p.h.

THE dates for the Lord Wakefield Boxing Competition, to be held at Henlow, have been altered from November 8 and 9 to November 15 and 16.

THE address of the Dublin depôt of the Chloride Electrical Storage Co., Ltd., has been changed from 8, Pearce Street to 164, Pearce Street, Dublin.

THE Shanghai Office of the Far-East Aviation Co., Ltd., has been moved to 659, Szechuen Road.

TWO new Directors, Mr. W. Cowen, who has been General Manager for some years, and Maj. Gen. Sir William G. Bertram Bayce, K.C.M.G., has just been appointed to the Board of Rolls-Royce, Ltd., of Derby.

COL. C. LINDBERGH thinks a great deal of the service he is getting from the Wright "Cyclone" engine of 750 h.p. which is installed in his Lockheed "Sirius" seaplane. He uses fuel of an octane value as high as 83, and for the most part relies on the normal fuel obtainable, adding lead as necessary himself. He also says that the Hamilton variable-pitch airscrew gives his machine a greatly increased performance. A notable feature of this engine is its economy with lubricating oil. Unlike some radial engines, it only consumes about 2 quarts per hr.

* * * *

Life Saving Waistcoats

THE R.A.F. has for some time made life saving waistcoats official equipment for pilots who fly over water, and it is only a matter of time before all private owners, who have any respect for their own lives, equip themselves likewise when journeying over large expanses of water. The type of waistcoat officially in use in the Service is the "Airvelope," made by Robinson & Cleaver, and Brian Lewis, of 30, Conduit Street, have undertaken the sole agency of these life saving waistcoats. They are marketed at 63s. each, and are specially designed to support the

wearer in a safe position during immersion in water. They may be fitted over any type of flying gear, and can be worn under parachute harness. The air container of the waistcoat is stole shaped and located on either side of the body from the neck down to the waist. A blow-up tube is fitted in an accessible position with a screw down valve on the mouthpiece. The waistcoat itself is of linen of super strength, with web fastening at chest and waist, and it is adjustable to every size that may be required. The pillow behind the head has a zip fastener across the back to allow for the withdrawal of the air tube, if necessary, and also to allow for the insertion of the Kapok pad; this pad is a further protection in case the air tube has not been inflated, and ensures that even without the inflated air tube the wearer can be assured that his head will be kept well out of the water, even though he be unconscious. Recent tests made by the National Lifeboat Institution have proved that this Life Saving Waistcoat, when inflated, has supported a weight equal to that of two men for a period of 24 hr. Tests have also proved that should the wearer fall, or be thrown into the water unconscious, the buoyancy of the waistcoat will make him float on his back, and the pillow will keep his head out of water.

The Exide Lunch

PRESIDING at the Annual Exide Press Luncheon, which is always held by the Chloride Electrical Storage Co. Ltd., at the Clarendon Restaurant, Hammersmith, London, on the opening day of the Motor Show at Olympia, Mr. D. P. Dunne, Managing Director of the Company, referred with obvious pleasure and justifiable pride to the continued development in the sales of Exide batteries and to the fact that the Clifton Works of the company were more than fully employed. He also spoke in favourable terms of the British Starter Battery Association, which had been formed to take care of irregular competition and to establish uniformity in the industry. He commented upon the high taxes levied on electric vehicles, and felt that these were particularly unfair if the duty was meant to be a measure of road wear and tear. In conclusion, he referred to the growing use of Exide batteries in Diesel buses and Diesel battery-electric three-power locomotives. Over 175 guests were present at the luncheon, which undoubtedly grows in popularity every year.

* * * *

PUBLICATIONS RECEIVED

Marine Aircraft Design. By Wm. Munro. London: Sir Isaac Pitman & Sons, Ltd. Price 20s. net.

Catalogue

Signals with Responsibility. Tangent Electro-Motor Syrens. Gent & Co., Ltd., Faraday Works, Leicester.

* * * *

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* * * *

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1932

Published October 19, 1933

- 7,389. F. B. HALFORD. Mechanism for driving impeller of supercharger for i.c. engine. (398,833.)
- 8,001. C. B. REDRUP. Valve mechanism of i.c. engines. (398,821.)
- 8,785. VICKERS (AVIATION), LTD. and T. S. DUNCAN. Fluid-pressure brakes for aircraft wheels. (398,892.)
- 13,133. VICKERS-ARMSTRONGS, LTD., J. P. WATSON and S. PARKER. Apparatus for use in the fire control of anti-aircraft guns. (398,950.)
- 21,575. FAIREY AVIATION CO., LTD. and A. G. FORSYTH. Variable-pitch airscrews. (398,993.)
- 34,724. J. GERIN. Aeroplanes having surfaces variable during flight. (399,048.)

APPLIED FOR IN 1933

Published October 19, 1933

- 6,675. DORNIER METALLBAUTEN GES. and C. DORNIER. Process for manufacture of metallic screw propellers. (399,102.)
- 18,096. E. SEPPELER. Variable-pitch screw propeller. (398,823.)

Personals

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(18 words or less 3/6, then 2d. per word).

To be Married.

READ : LEVERICH.—The engagement is announced between FLYING-OFFICER G. J. LACY READ, son of Mr. and Mrs. C. R. W. Read, of Shurton, near Bridgwater, and MARGARET CLAIRE, elder daughter of Mr. and Mrs. W. E. Leverich, of The Avenue, St. Margaret's-on-Thames.

FRENCH : HORSFALL.—The engagement is announced between FLIGHT-LIEUTENANT THOMAS HOWELL FRENCH, R.A.F., youngest son of the late H. D. D. French, Conservator of Forests, Forest Dept. of India, and the late Mrs. French, of Walham-le-Willows, and MARY ELIZABETH SIBYLLA (BETTY), only daughter of the Rev. W. Horsfall and Mrs. Horsfall, of Mellis Rectory, Suffolk.

FULLER-GOOD : BEECHING.—The marriage arranged between FLIGHT-LIEUTENANT J. L. F. FULLER-GOOD and Miss JOAN HELENA BEECHING will take place very quietly at Holy Trinity, Brompton, on October 21, at 12.30 p.m.

POOL : GOODMAN.—The engagement is announced between FLIGHT-LIEUTENANT J. H. POOL, R.A.F., elder son of the late T. W. Pool and Mrs. Pool, of Aston Rowant, Oxon, and MARGARET (Sunny), elder daughter of W. H. Goodman, M.R.I., F.R.S.A., F.Z.A., and Mrs. Goodman, of Burcott Cottage, Bierton, Aylesbury.

DAVIS : FOADEN.—The engagement is announced between FLIGHT-LIEUTENANT E. S. COLBECK DAVIS, A.F.C., elder son of Mr. and Mrs. Colbeck Davis, of Edgehill, Torquay, and CONSTANCE, daughter of Mr. and Mrs. Foaden, Betweenways, Ashburton.

MOIR : CROCKETT.—The engagement is announced between FLIGHT-LIEUTENANT JAMES FRANCIS MOIR, R.A.F., second son of Mr. and Mrs. W. J. Moir, of North Canterbury, New Zealand, and RUTH ISABEL, daughter of the late Mr. H. R. Crockett and Mrs. Crockett, of Long Spring, Melton, Suffolk.

HOLLAND : HOWARD.—A marriage has been arranged between FLIGHT-LIEUTENANT R. J. H. HOLLAND, Royal Air Force, and KATHLEEN MARY, only daughter of Mrs. A. A. Howard, of "Delbury," Oxford Road, Abingdon, Berks.

Married.

HARRISON : WHITEHEAD.—On October 7, 1933, at the Sacred Heart Church, Wimbledon, FLIGHT-LIEUTENANT F. H. HARRISON, R.A.F., only son of the late Brig.-Gen. Gilbert H. Harrison, C.B., C.M.G., and Mrs. Harrison, to DORA, daughter of Mr. and Mrs. Joseph Whitehead.

Births.

WARDLE.—On September 27, 1933, at Simla, India, to SARAH, wife of FLIGHT-LIEUTENANT A. R. WARDLE, A.F.C., R.A.F.—a son.

WORSTALL.—On October 6th, 1933, to ROSALEEN, wife of W. R. WORSTALL, R.A.F.—a son.

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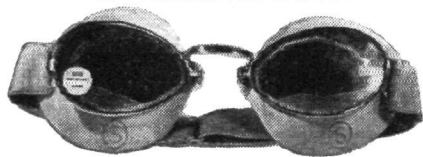
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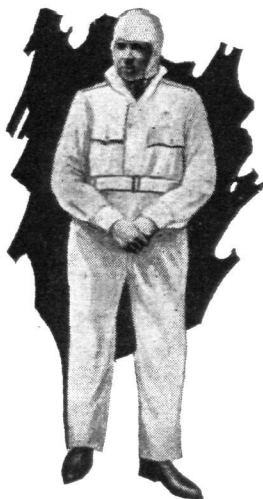
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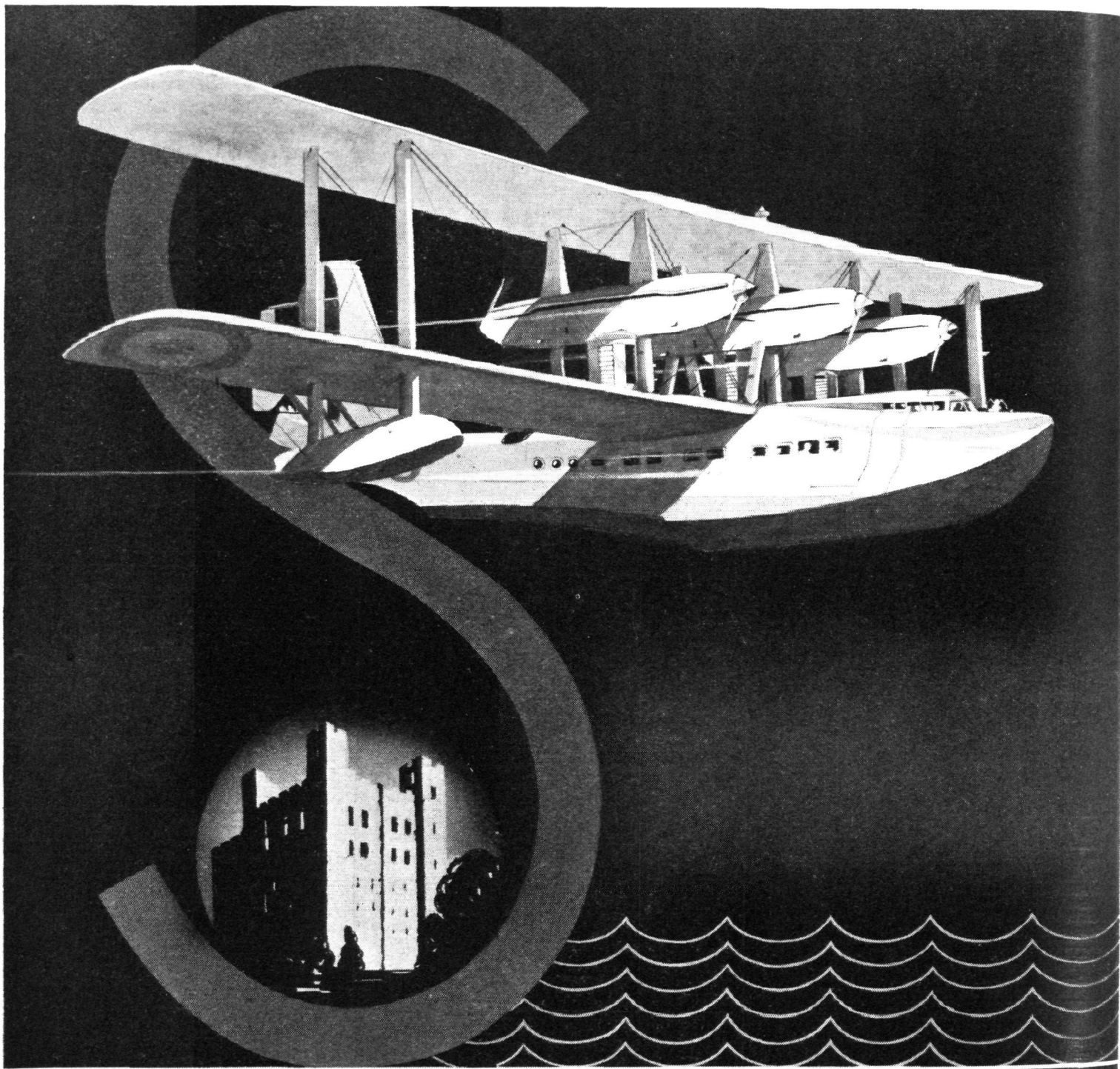
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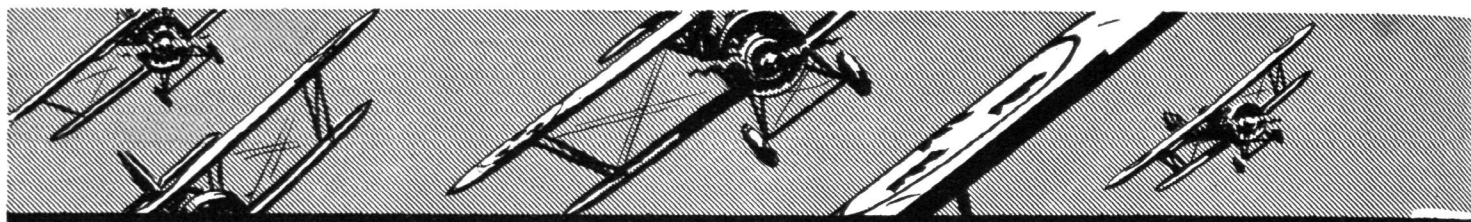
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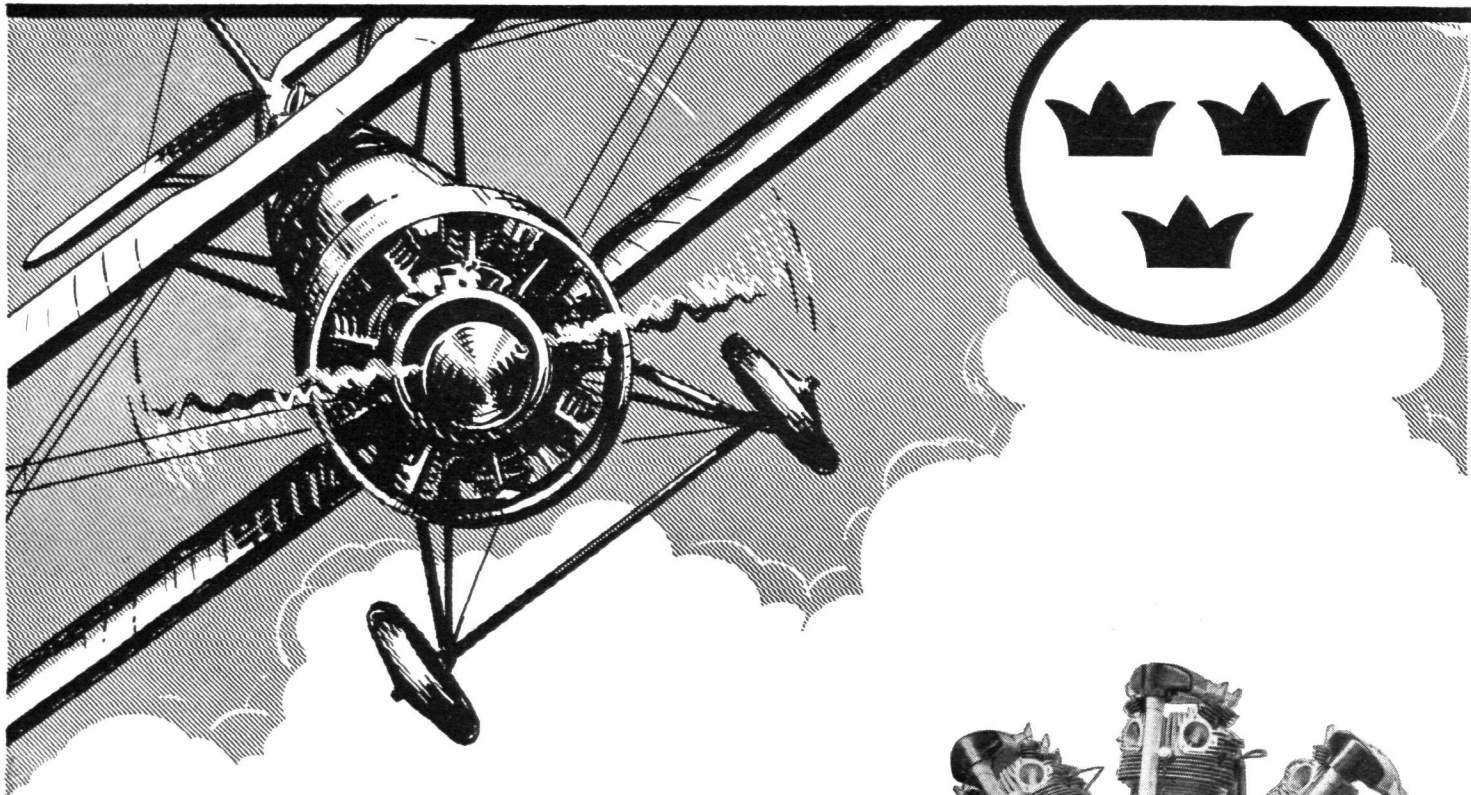
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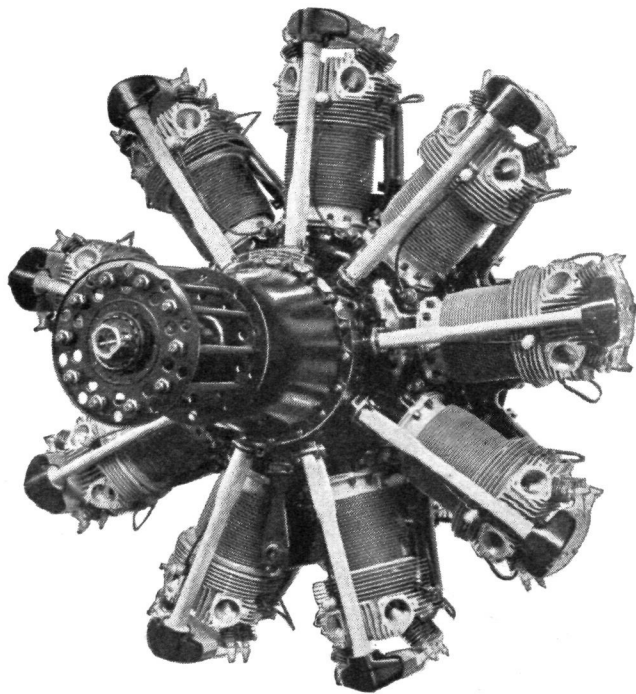


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